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An Illustrated Handbook on Microscopic Identification of Chinese Crude Drugs for Chinese Pharmacopoeia

国家药典委员会

Chinese Pharmacopoeia Commission



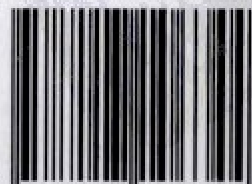


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序

中医中药是我国优秀传统文化瑰宝，为中华民族的繁衍昌盛作出了巨大的不可磨灭的贡献，直至今日，中医中药仍然是我国医疗卫生保健事业中的重要力量。中药是中医防治疾病的主要物质基础，中药的质量好坏，无疑将直接影响到中医的疗效。

《中华人民共和国药典》是保证国家药品质量的一部法典，作为国家药典委员会的一名成员，我经常在思考“药典”怎样才能更好地体现出“以人为本”的思想？

因此当我有幸先睹了国家药典委员会组织编著的《中华人民共和国药典中药材显微鉴别彩色图鉴》后，受到了很好的启迪：将药典中中药材的显微鉴别内容，通过图文并茂、科学翔实、形象生动并准确地展现在科技工作者和读者面前，这样的工作将大大提高并促进对中药材真伪优劣的鉴别的能力和效果，达到保证人民身体健康的目的，这无疑是一次体现“以人为本”思想的很好实践。

中药品种的真实性即基源，直接关系到实验研究的科学性、临床疗效和人民生命安全。显微鉴定法是中药真实性鉴别的重要手段之一，具有快速、简便、准确的特点，尤其中成药显微粉末鉴别是我国对国际社会的一项重要贡献！因此发达国家诸如美国药典、欧洲药典、日本药局方等也均收载有显微鉴别的内容，在实践中得到较为广泛的应用。在药品检验工作中，检验者要根据检品在显微镜下呈现的微观特征与已知中药对照品的显微特征进行比较而作出判断，因此，正确药材显微特征的彩色图谱将有助于准确地鉴定药材。

由中华人民共和国药典委员会组织编著的首部《中华人民共和国药典中药材显微鉴别彩色图鉴》是2005年版《中华人民共和国药典》一部的配套丛书之一。该书信息量大、数据翔实，所用样品全部为最新收集和制作，所有中药材的组织与粉末特征图谱全部为作者依据显微鉴别实验所得的原图，应用先进的数码显微摄影技术采集和Adobe Photoshop等图像处理软件处理编辑，因而该书又是一部中药材显微鉴定科研成果的专著。本书图谱逼真、清晰、显微特征明显，大大提高了中药材显微鉴别的水平，它必将对推动中医药事业的健康发展，提升我国中药监管水平发挥很好的作用，并产生深远的影响。

本书对从事药品检验、教学、科研、药材、饮片、中成药生产、供应、使用及国际贸易等方面的机构和有关人员是一部很有价值的工具书。同时本书的中英文对照编排，也将有助于推动中医药走向世界。有感于此，乐为之序。

中国工程院院士
中国医学科学院
药用植物研究所名誉所长
肖培根　教授
2008年7月29日

FOREWORD

Traditional Chinese medicine is the excellent Chinese cultural treasure and has contributed greatly to the prosperity of our nation. Till now, it is still the important force in the health care system in China. Since Chinese Crude Drugs (CCDs) are the principal substance basis for preventing and treating diseases of Chinese medicine, the quality of CCDs will, with no doubt, influence the efficacy of Chinese medicine.

The Chinese Pharmacopoeia *(ChP)* is a national standard to assure the quality of drugs in the country. As one of the members of the Chinese Pharmacopoeia Commission, I often think it over that how the Pharmacopoeia could better reflect the idea of "people foremost". After reading the book "An Illustrated Handbook on Microscopic Identification of Chinese Crude Drugs for Chinese Pharmacopoeia" compiled and organized by the Chinese Pharmacopoeia Commission, I was greatly enlightened. The book embraced the vivid picture, scientific descriptions and detailed illustrations of the microscopic characteristics of those CCDs recorded in the Pharmacopoeia, which makes it much easier for the species authentication and quality evaluation of CCDs, hence to safeguard the people's health. I should say that this is an excellent practice for the idea of "people foremost".

The authenticity of CCDs species, or origins, is directly related to the scientificity of research, efficacy of clinic and safety of the people's life. Microscopic identification is one of the important means for the authentication of CCDs, with characteristics as rapidness, simplicity and accuracy. And the microscopic powder identification of Chinese patent medicine is a great contribution of our country to the world. Therefore the Pharmacopeias of developed countries like the United States, Europe and Japan also recorded the contents of microscopic identification, which was received wide application in practice. In the drug testing practice, the inspectors have to draw a conclusion on the species identification by comparing the microscopic characteristics of tested samples with those of authentic CCDs species, therefore the colored pictures of the microscopic characters of correct crude drugs would be helpful for the accurate identification of CCDs samples.

This book entitled "An Illustrated Handbook on Microscopic Identification of Chinese Crude Drugs for Chinese Pharmacopoeia" compiled by the Chinese Pharmacopoeia Commission is one of the supplementary series of books to the *ChP* Volume I of 2005 edition. The book contained detailed and accurate data with vast information. All the samples used for compiling the book were newly collected and prepared, and the microscopic pictures of tissues and powders of CCDs were all the original pictures based on the first hand microscopic identification experiment and prepared by the advanced digital photographing technology and then processed by imaging software such as Adobe Photoshop, etc. Therefore the book is also a monograph of scientific research achievement on microscopic identification. The pictures of the book are lifelike with clear and obvious microscopic characteristics, hence it greatly enhanced the level of CCDs microscopic identification. It will definitely play a crucial role in promoting the development of CCDs cause and enhancing the level of our CCDs monitoring.

This book could be a valuable reference book for those engaged in drug testing, teaching, research, production, provision, application of CCDs and international trade. It would also help to promote the globalization of traditional Chinese medicine due to its bilingual illustration both in Chinese and English. Motivated by these ideas, I am pleased to write the foreword for this book.

Academician of Chinese Academy of Engineering
Honorary Director of Institute for Medicinal Plant Research,
Chinese Academy of Medical Sciences

Professor Xiao Pei-gen

July 29, 2008

前言

显微鉴别(microscopical identification)是指利用显微镜对药材及成方制剂组成药味的组织、细胞或细胞后含物等特征进行鉴别，以确定其真伪的一种方法，是中药鉴别的重要手段之一，具有简便、快速、直观等特点。美国药典、欧洲药典、日本药局方等在一些植物药项下收载有显微鉴别内容。《中华人民共和国药典》自1977年版开始在一些品种鉴别项下收载显微鉴别内容，随着中药显微鉴别研究的不断深入，各版药典收载的显微鉴别品种不断增加。2005年版《中华人民共和国药典》一部收载中药材551种、成方制剂564种，其中有显微鉴别项分别为335种和97种，占全部品种的61%和17%。

鉴于药典收载的显微鉴别特征均为文字描述，在药品检验工作中难以准确、快捷的做出判断，中华人民共和国药典委员会组织了长期从事中药鉴定工作并富有显微鉴别经验的专家、学者，对2005年版《中华人民共和国药典》一部收载显微特征的中药材进行收集、选材、制片和实验观察，编著了这部2005年版《中华人民共和国药典》一部的配套丛书，命名为《中华人民共和国药典中药材显微鉴别彩色图鉴》。这是迄今为止首部与《中华人民共和国药典》配套的中药材显微特征原创彩色图谱。

本书分总论和各论两部分。总论主要介绍显微鉴定的发展简史、中药显微鉴定的依据、中药显微鉴定的方法。各论按2005年版《中华人民共和国药典》一部的品名目次即药材中文名称笔画顺序，记载各种药材的显微特征文字描述和图谱。

本书各论收载品种为2005年版《中华人民共和国药典》一部具有显微鉴别项目的品种。其中组织显微特征115种；粉末显微特征169种；兼有组织和粉末显微特征51种。

文字描述均同2005年版《中华人民共和国药典》一部相应品种，采用中英文对照。显微特征图谱全部是根据药材显微镜检结果，应用数码显微摄影技术采集、Adobe Photoshop等图像处理软件处理编辑的原图。本书共收载药材组织特征图362幅，粉末特征图232幅。

在编写过程中，对2005年版《中华人民共和国药典》一部个别品种（详见本书附录）的显微特征作了修订，修订结果拟收载于《中华人民共和国药典》（2005年版）2008年增补本。

全书图像逼真、清晰、色彩真实，显微特征典型、齐全，文字说明为中英文对照，有重要的实用价值，可供从事药品检验、教学、科研、药材生产、供应及使用等有关人员参考。

本书由国家药典委员会策划和协调，并与中国药科大学共同作为主编单位，中国药品生物制品检定所、广东省药品检验所、上海市药品检验所、河北省药品检验所、江苏省药品检验所、北京市药品检验所、浙江省药品检验所、黑龙江省药品检验所为主要参加单位，山西省药品检验所也参加了部分工作。中国药科大学对成书发挥了重要作用，特别是全书承蒙我国著名生药学家徐珞珊教授主审，周富荣、刘午霞、李萍、肖新月、季申和林惠蓉等专家对全书进行了统一审校。谨此一并致谢。

享誉国内外的药用植物学资深专家、中国工程院院士、中国医学科学院药用植物研究所肖培根教授对本书的隆重出版十分关注，给予高度评价，并欣然为本书提笔作序，在此表示衷心的感谢。

国家药典委员会

2008年3月

PREFACE

Microscopic identification is a method using a microscope to identify the characteristics of tissue, cells and ergastic substances in Chinese Crude Drugs (CCDs) samples and their preparations, so as to determine the authenticity of CMM. As one of the most important methods for CCDs identification, the microscopic identification, which possesses such characteristics as easy and fast operation with audiovisuality, is also included in Pharmacopoeias of US, Europe and Japan for some botanical medicines. The Pharmacopoeia of the People's Republic of China *(ChP)* started to record the microscopic identification under the identification items ever since the 1977 edition. With more research done in this field, more and more CCDs species were added with the microscopic identification items in the following editions, up to 335 out of 551 CCDs and 97 out of 566 Chinese patent medicines (CPM) included in the 2005 edition, comprising 61% and 17% of all species, respectively.

Since the microscopic identification is only verbally recorded in the pharmacopoeia, which is hard to make a quick and accurate judgement in the drug testing process, a group of experts and scholars who are competent in microscopic identification were, therefore, organized by the Pharmacopoeia Commission of PRC to conduct a series of experiments on the CCDs species recorded in *ChP* including collection of the samples, material selection, preparation of slice specimen and experimental observations, etc. Their endeavors led to the publication of this original colored atlas supplementary to *ChP* for the first time, which is accordingly entitled as "An Illustrated Handbook on Microscopic Identification of Chinese Crude Drugs for Chinese Pharmacopoeia".

This publication is divided into two sections-General Introduction and Individual Descriptions. The brief developmental history, basis and methods of microscopic identification were mainly introduced in the General Introduction. The verbal description and pictures of microscopic characteristics of each CCD were recorded in the Individual Descriptions section, which is arranged by the list order of CCDs species in *ChP* Volume I, i.e., the number of strokes of the first Chinese character of the CCDs's names.

All the species with microscopic identification items recorded in *ChP* Volume I (2005 edition) were documented in this supplementary book, including 115 microscopic characteristics of tissues, 169 of powders and 51of both tissues and powders.

The verbal description for the CCDs'3. species are the same as those of corresponding species recorded in *ChP* volume I of 2005 edition written in both Chinese and English. The published microscopic pictures were all original ones presenting the first-hand photographs of authentic CCDs species observed under a microscope taken with digital photographing technique and then processed by some imaging software such as Adobe Photoshop, etc. Totally 362 pictures of characteristics of tissues and 232 of powders were documented in this publication.

During the course of compiling this book, the microscopic characteristics of a few species which are different from those recorded in *ChP* 2005 edition were revised and recorded in the 2008 enlarged edition of *ChP* 2005 edition.

Since the pictures are vivid, clear, true colored, with complete microscopic characteristics and bilingual illustration in Chinese and English, this publication is of great practical value, and could be an excellent reference book for those engaged in drug inspecting, teaching, investigating, manufacturing, supplying and using.

Chinese Pharmacopoeia Commission takes the leading role in organization and coordination of this book. Together with China Pharmaceutical University, they are the two institutions to take the co-editorship of this book. Other institutions to participate in compiling the book include the National Institute for the Control of Pharmaceutical and Biological Products, the provincial institutes for drug control of Guangdong, Shanghai, Hebei, Jiangsu, Beijing, Zhejiang, Heilongjiang, as well as Shanxi. China Pharmaceutical University played a crucial role in the accomplishment of this book. In addition, Prof. Xu Luoshan, a well-known expert in the field of pharmacognosy in China, as the major examiner of this book and many other experts like Zhou Furong, Liu Wuxia, Li Ping, Xiao Xinyue, Ji Shen and Lin Huirong etc. had checked and approved it before publication. Here we would like to greatly acknowledge those institutions and experts for their contributions to this book.

Our great acknowledgement also goes to Prof. Xiao Peigen,an honored leader of the Institute of Medicinal Plant Research of Chinese Academy of Medical Sciences, a well-known medicinal botanist home and abroad and an academician of Chinese Academy of Engineering, for his highly praised comment on the publication of this book and his generosity to write a foreword for the book.

Chinese Pharmacopoeia Commission

编写说明

1. 本书分总论与各论两部分。各论收载品种为2005年版《中华人民共和国药典》一部具有显微鉴别项目的品种。其中收载有组织特征的115种；有粉末特征的169种；兼有组织和粉末特征的51种。

2. 本书实验样品全部由作者收集，显微特征图也全部是作者制作的原图，并应用数码显微摄影技术采集，Adobe Photoshop等软件处理编辑而成。图版均附有标尺。全书共收载药材组织特征图362幅，粉末特征图232幅。

3. 本书目录按2005年版《中华人民共和国药典》一部的品名目次即药材中文名称笔画顺序排序。

4. 每品种项下收载的内容包括：品名（包括中文名、汉语拼音名、拉丁名）、来源［包括科名、植（动）物名、拉丁学名及药用部位］、显微特征（含中英文描述、彩图、中英文图注）。文字描述同2005年版《中华人民共和国药典》一部相应品种。在编写过程中，对2005年版《中华人民共和国药典》一部个别品种（详见本书附录）的显微特征作了修订，修订结果已收载于《中华人民共和国药典》（2005年版）2008年增补本。

5. 本书附有索引，分别按汉语拼音索引、药材拉丁名索引及拉丁学名索引顺序排列。

6. 药典收载的药材有多种来源的，凡显微特征相同者，本书只收录其中一种，在图注中以加注拉丁学名表示。

7. 凡药典涉及到的有关显微化学鉴别内容，本书未收录。如：儿茶、牛黄、体外培植牛黄等。

8. 同一药材的炮制品，凡显微特征相同者，本书未收录，以附注的形式说明。如：法半夏。

9. 鉴于本书属《中华人民共和国药典》的配套丛书，显微鉴别项下出现的习用药材名请注意参见图注中拉丁学名溯源。如：葶苈子项下，北葶苈子图注中标出拉丁学名*Lapidium apetalum*；南葶苈子标出拉丁学名*Descurainia sophia*。

10. 部分多来源品种或多个药用部位品种项下未附彩图者，仍保留有药典相应文字。

EDITORIAL NOTES

1. The book includes two parts-General Introduction and Individual Descriptions, the latter of which documented all the species of Chinese Crude Drugs (CCDs) with the microscopic identification items in "the Pharmacopoeia of People's Republic of China" (2005 edition) (hereinafter abbr. *ChP*). Among them, there are 115 species with tissue characteristics, 169 with powder characteristics and 51 with both characteristics of tissue and powder.

2. The experimental samples used were all newly collected and prepared, and the microscopic characteristic pictures were the digital ones, processed and edited with some image processing software (e.g. Adobe Photoshop) by the authors. The magnification of the published photograph is specified with a measuring scale. Altogether 362 pictures of tissue characteristics and 232 powder characteristics of CCDs were compiled in this book.

3. The table of contents of this book are arranged in accordance with *ChP*, and ordered by the number of strokes of the first characters of the CCDs's Chinese names.

4. For each documented CCDs, the recorded items include: the species name (including Chinese name, Chinese phonetic name and Latin name), source (including family name, plant or animal name, Latin scientific name and used part), microscopic characteristics (including descriptions, colored pictures and figure legends both in Chinese and English). The descriptions were in accordance with those of the corresponding species written in *ChP*. During the compiling process, the microscopic characteristics of some special species recorded in *ChP* volume I were revised (see the appendix for detail) and recorded in the 2008 supplement of *ChP* 2005 edition.

5. This book is appended with several indexes and arranged in order by Chinese phonetic name index, Latin name index and Latin scientific name index.

6. For the multiple sourced species of CCDs in *ChP*, this book only recorded the characteristics of one species with the Latin name in the figure legend if their microscopical characteristics are the same.

7. This book does not documented the contents regarding the micro-chemical identification recorded in *ChP*, but only appended with foot notes, such as Catechu, Semen Myristicae, Fructus Arctii, in vitro cultured Calculus Bovis etc.

8. This book does not documented the processed CCDs, sourced from of the same species if they are the same in microscopical characteristics, such as Rhizoma Pinelliae Preparatum.

9. As this publication belong to one of the supplementary series of books to the *ChP*, the habitually used names under the item of microscopical identification should be refered to the Latin scientific name in the figure legend. For example, under the item of Semen Lepidii, the Latin name of *Lapidium apetalum* was given in the figure of North Semen Lepidii and *Descurainia sophia* was given in the South Semen Lepidii.

10. The corresponding verbal descriptions in *ChP* were retained for those species with multiple resources or multiple used parts, which have no colored pictures.

目录

总论

各论



CONTENTS

General Introduction

Latin Name Index of CMM



L

M

O

P

R

S

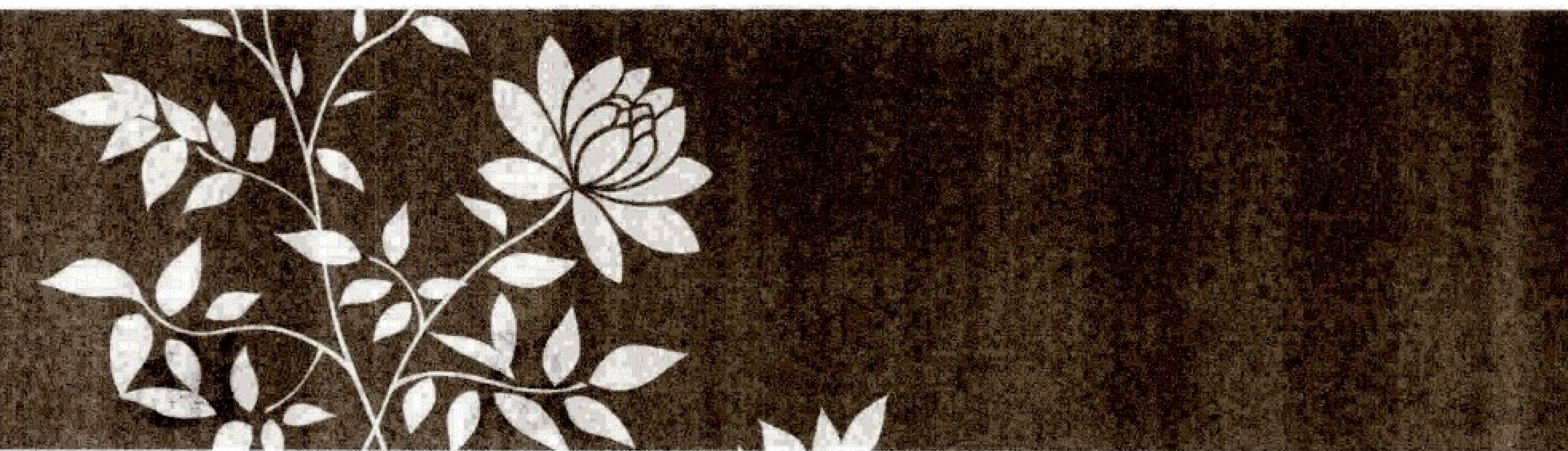




总　　论

显微鉴别系指利用显微镜对药材（饮片）及成方制剂组成药味的组织、细胞或细胞后含物等特征进行鉴别，以确定其真伪的一种方法，是中药鉴别的重要手段之一。显微鉴别是一项专门技术，需要有植（动）物解剖学、矿物晶体光学、植物显微化学等基本知识，掌握显微制片、摄影等基本技术。显微鉴别通常适用于性状鉴定不易识别的药材、性状相似不易区别的多来源药材、破碎药材、粉末药材及由粉末药材制成的中药成方制剂的鉴定。







第一章　显微鉴别发展简史

1838年德国学者Schleiden阐明了细胞是植物体的基本单位，并利用显微镜观察了多种生药的显微构造，于1857年发表了《Grundniss der Pharmakognosie des Pflanzen-reiches》（植物性生药学基础）一书，书中描述了许多植物药的显微构造，发现根据显微构造的不同，各种生药可以准确区别。其后，利用显微镜鉴别生药的方法得到了进一步的发展，成为生药鉴定的重要手段之一。德国J. Moeller于1892年所著《Anatomischer Atlas》（解剖图谱）是一本描述德国药典中重要粉末植物生药显微特征的著作。英国B. E. Nelson于1900—1907年间进行了粉末生药的显微特征的描绘，他在1910年所著《Introduction of the Analysis of Drugs and Medicines》（生药和药品分析入门）一书中，介绍了粉末生药显微分析的方法，绘有较精细的显微特征图，并将197种粉末生药按类别编制了详细的检索表。1916年，英国生物学家Wallis创立了以石松孢子为参考标准的显微定量方法，从而使粉末生药的纯度鉴定得到发展，并在此后又发展了一系列生药的显微定量常数（如栅表比、气孔指数、脉岛数等），对生药显微定量进行了尝试。美国A. Schneider于1921年所著《The Microanalysis of Powdered Vegetable Drugs》（粉末植物生药显微分析）第二版，较全面、详细地叙述了研究粉末植物生药的通则、操作方法、显微描述及检索表的编列等，并收载了210种粉末生药的显微特征和特征图。这本书是早期最著名的粉末生药学专著。2001年出版的《日本药局方》收载有65种生药显微鉴别项，2004年出版的《美国药典》收载了36种生药的显微鉴别项，2004年出版的《英国药典》收载了119种生药的显微鉴别项，2005年出版的《European Pharmacopoeia》（欧洲药典）收载有115种植物药的显微鉴别项。

我国于1912年教育部公布的药学教育课程中，列有“粉末生药学”课程，国立药学专科学校于20世纪30年代末开设有生药粉末鉴定课程，但在新中国成立前很少进行这方面的研究。1951年徐国钧发表了101种“粉末生药鉴定检索表”（《北华药讯》3卷6期，4卷1期），其中包括国产生药40余种。随后于1975年出版了《粉末药材显微鉴定》专著，收录了100种粉末鉴定的全文和特征图。后来，又依据《中华人民共和国药典》1977年版一部收录中成药丸散锭丹的组成药物为主要对象，继续进行中药粉末鉴定特征研究，并于1986年出版了《中药材粉末显微鉴定》的研究专著，收录了380种中药材粉末鉴定的全文和特征图。

我国中成药的显微鉴别始于1948年，当时管光地为了论证云南白药包装中附有一粒“保险子”是由茄科曼陀罗属植物的种子所制成，曾作了保险子的粉末鉴定，并将研究结果发表在《药讯期刊》1948年第6期上。此后，随着生产和质量管理的需要，中成药的显微鉴别研究逐渐开展。1956年徐国钧等将粉末生药学的方法用于“南京灵应痧药”的鉴定，检出了麝香、蟾酥、天麻、麻黄、甘草、苍术、丁香、大黄、雄黄、朱砂等组分，研究结果发表在《中药通报》第2卷第4期上，开创了中成药显微鉴别的先例。随后陆续发表文章报道半贝丸、左金丸、香连丸等18种商品中成药的显微鉴别结果。1973—1975年南京药学院配合国家药典工作，协同有关省、市单位，观察和制定了石斛夜光丸等66种中成药的显微鉴别项目，并连同原料药材154种的粉末特征汇集成文（南京药学院1977年科学报告会资料）。1975年初，南京药学院受国家药典委员会的委托，举办了中成药显微鉴别经验交流学习班，共同对全国各地起草的近百种中成药显微鉴别内容作了复核。研究结果填补了《中华人民共和国药典》中成药显微鉴别的

空白，1977年版收载的中成药丸散类约270种中，规定显微鉴别项目的有179种，占66.3%。随后，中国药科大学于1997年出版了《中成药显微分析》，收录了200种中成药的显微鉴别全文和特征图。

随着我国显微鉴别研究工作的不断深入，各版药典收载有显微鉴别项的中药材和成方制剂不断增加，如下表。

中国药典	收载药材总数	具有显微鉴别项药材数	所占比例（%）	收载制剂总数	具有显微鉴别项的制剂数	所占比例（%）
1977年版	745	257	34.5%	270	179	66.3%
1985年版	459	213	46.4%	207	158	76.3%
1990年版	497	248	49.9%	248	171	69.0%
1995年版	508	295	58.1%	359	234	65.2%
2000年版	536	303	56.5%	409	247	60.4%
2005 年版	551	335	60.8%	517	273	52.8%

从以上的简略介绍可以看出国外对粉末生药的显微鉴别研究起步较早，有悠久的历史，其研究对象大多是常用的或是国家药典、国家药品处方集中收载的生药，研究目的主要是为了防止粉末生药的掺杂或假冒，保证粉末生药的品质。我国的显微鉴别研究始于1951年，经历了20世纪50年代的零星研究和60年代以后的系统研究。现今显微鉴别已成为我国药典药材和中成药鉴别的重要方法之一。



第二章　中药显微鉴别的原理

中药来源于植物、动物和矿物，其微观结构因种类的不同而有显著差异，这些微观结构的差异可以作为显微鉴别的依据。所以，中药显微鉴别的原理就是利用显微镜观察、记录各种中药显微特征的差异，用以鉴别物（品）种。

一、植物类中药的显微鉴别原理

应用植物形态学和解剖学等知识，结合显微技术，通过观察和测试植物类中药细胞、组织或后含物的特征，进行物种鉴定。

（一）细胞及其后含物特征

植物细胞是构成植物体的形态结构和植物生命活动的基本单位。典型的植物细胞由细胞壁、原生质体、细胞后含物和生理活性物质等组成，细胞及其后含物的特征，是显微鉴别的重要依据。

对于中药鉴定具有重要价值的细胞特征主要有细胞的形状、颜色、表面纹理，细胞壁的增厚情况、纹孔形态等。对于中药鉴定具有重要价值的细胞后含物特征主要有淀粉粒（常含在各种薄壁细胞中）、糊粉粒（常含在种子胚乳细胞中）、脂肪油（常在种子胚乳细胞中）、挥发油（常在油细胞中）、黏液质（常在黏液细胞中）、菊糖（常在各种薄壁细胞中）、草酸钙结晶（针晶、簇晶、砂晶、方晶、棱晶、柱晶等）、碳酸钙结晶（又名钟乳体）、硅质晶体、橙皮苷结晶等。

（二）组织特征

来源相同、形态结构相似、功能相同，而且彼此联系的细胞群称为组织。植物的组织可分为分生组织、基本组织、保护组织、分泌组织、机械组织和输导组织六类，后五类都是由分生组织分生分化而来的，所以又统称为成熟组织。在中药鉴定中，组织及特化细胞的形态特征，是显微鉴别的重要依据。观察保护组织时注意气孔的类型及气孔器的构造；腺毛、非腺毛、腺鳞的类型及构造等。观察分泌组织时注意乳汁管、树脂道、油管、油室、油细胞等的形态及构造。观察机械组织时注意纤维、石细胞的形态及构造。观察输导组织时注意导管或管胞、筛管或筛胞的形态及构造；中柱及维管系统的分化及类型等。

（三）器官特征

主要观察根及根茎、茎、皮、叶、花、果实、种子等的组织排列和构造。

（四）细胞及其后含物特征、组织特征、器官特征在中药鉴定中的应用

1. 根类药材

（1）组织构造：大多为被子植物的根，根据维管组织特征，可区别其为双子叶植物根的初生构造、

次生构造或为单子叶植物根。

多数双子叶植物根类药材为次生构造，表层为木栓组织；次生皮层狭窄；韧皮部较发达或较狭窄；形成层环多明显；木质部由导管、管胞、木纤维、木薄壁细胞及木射线组成；中央大多无髓（如甘草），少数有明显的髓部（如龙胆、乌头）。

少数双子叶植物根类药材为初生构造，皮层宽，中柱小，木质部束及韧皮部束数目少，相间排列，初生木质部呈星芒状，一般无髓（如细辛）。

有些双子叶植物根有异常三生构造，例如何首乌根的形成层环外方有数个异常复合维管束；牛膝有数轮同心排列的维管束；商陆、沙参、狼毒等均有三生构造。此外颠茄、华山参具内含韧皮部（木间韧皮部）异常构造。

单子叶植物根类药材一般无木栓组织，其表皮细胞外壁有时增厚，也有表皮发育成数列根被细胞，壁木栓化或木质化；皮层宽广，占根的大部分；内皮层凯氏点（带）通常明显；中柱小；木质部束及韧皮部束数目多，相间排列成一圈；中央髓部大多为薄壁细胞（如百部），有的细胞壁木化增厚（如短葶山麦冬、菝葜）。

根类药材常有分泌组织，大多分布于韧皮部，包括乳汁管、树脂道、油室或油管、油细胞等。根类药材中常有各种草酸钙结晶，包括簇晶、方晶、砂晶、针晶等。此外，纤维、石细胞、淀粉粒、菊糖的有无及形状亦具有重要鉴别意义。

（2）粉末特征：除了无叶肉组织外，其他细胞、组织碎片都有可能存在。根的木栓组织多见，应注意木栓细胞表面观的形状、颜色、壁的厚度。导管一般较粗，应注意其类型、直径、导管分子的长度及末端壁的穿孔、纹孔的形状及排列等。石细胞应注意形状、大小、细胞壁增厚形态和程度、纹孔形状及大小、孔沟密度等特征。纤维观察时要注意纤维的形状、长短、粗细、胞壁增厚的程度及性质、纹孔类型、孔沟形态、排列等特征；同时还要注意纤维束的周围细胞是否含有结晶形成晶鞘纤维。分泌组织观察时应注意分泌细胞、分泌腔（室）、分泌管（道）及乳汁管的类型、分泌细胞的形状、分泌物的颜色、周围细胞的排列及形态等特征。结晶大多为草酸钙结晶，其次还有菊糖、硅质晶体等，应注意结晶的类型、大小、排列及含晶细胞的形态等。淀粉粒一般较小，应注意淀粉粒的多少、形状、类型、大小、脐点形状及位置、层纹等特征。

根类药材的根头部如附有叶柄、茎的残基或着生毛茸，在粉末中可见到叶柄的表皮组织、气孔及毛茸。

2. 根茎类药材

（1）组织构造：大多数是以被子植物地下茎入药，包括根状茎（根茎）、块茎、鳞茎及球茎，以根茎多见。可根据中柱、维管束的类型，区别其为蕨类植物、双子叶植物或单子叶植物的根茎。

蕨类植物根茎的最外层，多为厚壁性的表皮及下皮细胞，基本薄壁组织较发达。中柱的类型，有的是原生中柱，即木质部（只有管胞）位于中心，韧皮部位于四周，外有中柱鞘及内皮层（如海金沙）；有的是双韧管状中柱，即木质部呈圆筒状，其内外侧各有韧皮部及内皮层（如狗脊）；有的为网状中柱，即在横切面可见数个分体中柱断续排列成环状，每一分体中柱为一原生中柱状（如绵马贯众）。根茎表面鳞片的形状、边缘特征有一定鉴别意义（如骨碎补）。

双子叶植物根茎大多有木栓组织，或木栓石细胞（如苍术、白术）；皮层中有时可见根迹维管束；中柱维管束无限外韧型，环列；中心有髓（如黄连）。少数种类有三生构造，髓部有异常复合维管束（如大黄）。

单子叶植物根茎的最外层多为表皮，皮层中有叶迹维管束，内皮层大多明显，中柱中散有多数有限外韧型维管束或周木型维管束（如石菖蒲）。较粗的根茎、块茎等的内皮层不明显。鳞茎的鳞叶表皮可见气孔。

有的根茎类药材有油室（如川芎、苍术、白术）或油细胞（如石菖蒲、香附）；有的含草酸钙针晶

束（如天南星、半夏、天麻、白及、黄精、玉竹等），针晶束大多存在于黏液细胞中。此外，鉴别时对厚壁组织、导管以及草酸钙结晶的类型等均应注意。

（2）粉末特征：与根类药材相似。注意鳞茎、块茎、球茎常含大量的淀粉粒，其形状、大小、脐点、层纹以及复粒、半复粒、多脐点单粒等特征是鉴别的重要依据。鳞茎的鳞叶表皮常可察见气孔。单子叶植物根茎较易见到环纹导管。蕨类植物根茎只有管胞。

3. 茎藤类药材

（1）组织构造：大多为双子叶植物草质茎或木质茎，少数为单子叶植物茎。可根据维管束的类型及排列，区别其为双子叶植物茎或单子叶植物茎。

双子叶植物草质茎大多有表皮，应注意细胞形状、外壁增厚、气孔及有无毛茸等；皮层为初生皮层，其外侧常分化为厚角组织；中柱鞘常分化为纤维或夹杂有石细胞；束中形成层明显；次生韧皮部大多成束状或板状；髓较大（如薄荷）。

双子叶植物木质茎最外为木栓组织；皮层多为次生皮层；中柱鞘厚壁组织多连续成环或断续；形成层环明显；次生韧皮部及次生木质部呈筒状结构；射线较窄，细胞壁常木化；髓较小（如桂枝）。双子叶植物木质藤本茎的木栓层较厚，有的有落皮层；维管组织被射线分隔成明显的放射状纹，导管孔较大（如关木通），有髓周厚壁细胞，或有异型构造——髓维管束（如海风藤）。

此外，应注意有无分泌组织、草酸钙结晶、淀粉粒、树脂及色素物等。

单子叶植物茎最外层为表皮，表皮下如有下皮厚壁细胞常为鉴别特征，其内基本组织中散生多数有限外韧维管束，中央无髓（如石斛）。

裸子植物茎的木质部主要为管胞，通常无导管，但麻黄茎的构造与双子叶植物草质茎类同。

（2）粉末特征：除了无叶肉组织外，其他组织一般都可能存在。

4. 皮类药材

（1）组织构造：皮类药材是指木本植物形成层以外的部分，通常包括木栓组织、皮层及韧皮部。观察木栓组织应注意木栓细胞的层数、颜色、细胞壁的增厚程度等；木栓层还有一些特殊的变化，如杜仲木栓细胞的内壁增厚，肉桂最内层木栓细胞的外壁与侧壁增厚，较老的皮可见落皮层（如地骨皮、杜仲）。皮层狭窄，通常是由栓内层形成的次生皮层。韧皮部占皮的绝大部分，全部有射线贯穿，通常射线所达到的部位，即为韧皮部与皮层的分界，应注意韧皮射线的宽度（细胞列数）、射线细胞的形状、壁厚度、纹孔、内含物等。韧皮部及皮层往往有厚壁组织（纤维或石细胞）存在（如桑白皮、黄柏）；有的皮类药材的韧皮部中，纤维或石细胞切向集结成若干层带（硬韧部），与筛管群、薄壁组织（软韧部）相间排列（如杜仲、秦皮）。

皮类药材常有树脂道、油细胞、乳汁管等分泌组织以及草酸钙结晶。多数皮类药材含淀粉粒，但较微小。

（2）粉末特征：主要有木栓细胞、纤维、石细胞、分泌组织及草酸钙结晶等。筛管分子端壁复筛板的筛域常可察见，松科植物筛胞侧壁上的筛域亦易见（如土荆皮）。一般不应有木质部的组织，如导管、管胞等。

5. 木类药材　木类药材指木本植物树干、根形成层以内的所有组织，即主要为次生木质部（木材）。药用一般为心材。次生木质部的主要组成有轴向系统的导管、管胞、纤维、木薄壁细胞及径向系统的射线薄壁细胞。

（1）组织构造：木类药材通常从三个切面观察组织构造。横切面主要观察木射线宽度（细胞列数）、密度，导管与木薄壁细胞的比例及分布形式，导管和木纤维的形状、直径等；切向纵切面主要观察木射线的宽度、高度及类型，木射线在切向纵切面呈梭形，其宽度是指最宽处的细胞数，高度是指从上至下的细胞数，同时观察导管、木纤维等；径向纵切面主要观察木射线的高度及细胞类型（同型细胞射线或异型细胞射线），木射线在径向纵切面呈横带状，与轴向的导管、木纤维、木薄壁细胞相

垂直，同时观察导管的类型，导管分子的长短、直径及有无侵填体，木纤维的类型及大小、壁厚度、纹孔等（如沉香）。

木类药材的导管大多为具缘纹孔导管；木纤维可分为韧型纤维及纤维管胞，韧型纤维细胞壁无纹孔或有单斜纹孔，纤维管胞有具缘纹孔；木射线细胞及木薄壁细胞一般木化，具纹孔。还有一些特殊的变化，如沉香有内含韧皮部，细胞壁非木化，并具有草酸钙柱晶；樟木有油细胞；檀香有管状分泌细胞，含草酸钙方晶并形成晶鞘纤维。裸子植物木类药材主要观察管胞及木射线细胞。

（2）粉末特征：以导管、木纤维、木薄壁细胞、木射线细胞的形态特征，以及细胞后含物为主要鉴别点。

6. 叶类药材

（1）组织构造：通常作横切片观察表皮、叶肉及叶脉的组织构造，要注意上、下表皮细胞的形状、大小、外壁、气孔、角质层厚度，以及有无内含物，特别是毛茸的类型及其特征。有的表皮细胞中含钟乳体（如穿心莲），有的上、下表皮细胞外壁呈乳头状突起（如荷叶上表皮细胞外壁呈乳头状突起、箭叶淫羊藿的下表皮细胞外壁呈乳头状突起）。叶肉部分注意观察栅栏组织细胞的形状、层次及所占叶肉的比例和分布，叶肉中有无石细胞或分泌细胞存在，如番泻叶上下两面具栅栏组织，颠茄叶栅栏组织下有结晶细胞层，桑叶有乳汁管分布，茶叶叶肉细胞中有大型石细胞等。

（2）叶的表面制片：主要观察表皮细胞、气孔及各种毛茸的全形，以及叶肉组织的某些鉴别点，如草酸钙结晶类型及其分布等。应注意上、下表皮细胞的形状，垂周壁，角质层纹理，气孔的形式。毛茸为叶类药材的重要鉴别特征，应注意观察非腺毛、腺毛的细胞形状、细胞壁的厚度及其表面特征。菊科植物叶的非腺毛其顶端细胞呈水平方向延长，近中部连接几个短细胞，成“T”型毛，顶端细胞左右两臂的长短有鉴别意义；唇形科植物的腺毛，头部呈扁球形，主要由8个细胞组成，外被角质层，柄单细胞而短，形成腺鳞，其头部及柄部的直径及颜色有鉴别意义。

另外，观察叶的表面制片，可用以测定栅表细胞比、气孔数、气孔指数及脉岛数，对鉴别亲缘相近的同属植物的叶，有一定参考意义。

（3）粉末特征：与叶的表面制片基本一致，但毛茸多碎断，粉末中还可见到叶片的横断面及晶体。

7. 花类药材　根据药用部分的不同，将苞片、花萼、花冠、雄蕊或雌蕊等分别做表面制片，或将完整的花做表面制片观察。苞片、花萼的构造，与叶相似。花冠上表皮细胞外壁常呈乳头状或绒毛状突起，有的花冠有油室（如丁香），或管状分泌细胞（如红花）。花冠表皮的毛茸也是重要鉴别特征，如几种金银花可依据花冠的毛茸加以区别。雄蕊花粉囊内壁细胞常呈网状、条状或点状增厚，且多木化。花粉粒为花类药材的重要特征，应注意其形状、大小、萌发孔状况、外壁雕纹等（如红花的花粉粒外壁呈齿状突起、金银花花粉粒外壁表面有细密短刺及圆形的细颗粒状雕纹）。雌蕊柱头的表皮细胞特别是顶端的表皮细胞常呈乳头状突起，或分化为绒毛状（如西红花）。

花类药材粉末的观察，以花粉粒、花粉囊内壁细胞、非腺毛、腺毛为主要鉴别点，并注意草酸钙结晶、分泌组织及色素细胞等。

8. 果实类药材

（1）组织构造：一般观察果皮的组织特征。由子房壁分化和增大形成的真果的果皮，可分为外果皮、中果皮及内果皮。

外果皮为果皮的最外层组织，相当于叶的下表皮。通常为1列表皮细胞，观察注意点同叶。中果皮位于内外果皮之间，相当于叶的叶肉组织，其间贯穿细小维管束，一般偏于内方，维管束大多外韧型，也有双韧型或两个外韧维管束合成维管柱；中果皮中常有分泌组织及厚壁组织分布。内果皮的变异较大，有的为1列薄壁细胞，有的散在石细胞或结晶细胞层等。

由于果皮的高度分化，不是所有的真果的果皮可明显分出外果皮、中果皮及内果皮。同时由于子房下位发育形成的假果，其心皮和心皮以外组织之间没有清楚的界线。

（2）粉末特征：主要有果皮表皮碎片、中果皮薄壁细胞及纤维、石细胞、结晶等。无木栓组织、叶片碎片、花粉粒及大导管。

观察外果皮应注意细胞的形状、垂周壁的增厚状况、角质层纹理以及非腺毛、腺毛的有无及其特征；中果皮薄壁细胞注意细胞形状、壁增厚情况以及有无分泌组织、草酸钙结晶、淀粉粒、有色物质等。

果皮石细胞常成群或单个散在，注意其形状、大小、壁厚度、纹孔及孔沟、层纹，有的石细胞中含棕色物（皱皮木瓜）；有的含结晶（猪牙皂含方晶及簇晶）。

果皮纤维常成束或上下层交错排列，注意纤维的颜色、长短、直径、壁厚、纹孔及孔沟。有的纤维短小，与石细胞近似，如连翘；有的为晶纤维，如猪牙皂。结晶以簇晶及方晶为多见，砂晶极少见。注意结晶的形状、大小。

此外，注意有无镶嵌状细胞、内果皮表皮碎片等。

含种子类的果实类药材，粉末中尚可见种皮、胚乳及胚的组织碎片，可参见种子类药材的显微鉴别。

9. 种子类药材

（1）组织构造：种皮解剖构造具有多样性，有时是全科同型的，如伞形科、菊科，但往往同一科的种子，其种皮解剖构造也有很大区别。

种皮的结构取决于珠被的数目、厚度和维管束的序列，以及种子成熟过程中珠被在发育上的变化。几乎全部单子叶植物和大多数双子叶植物离瓣花类均为双珠被型；双子叶植物合瓣花类为单珠被型；相当多的科既有双珠被又有单珠被；极少数有三层珠被；也有无珠被的。

种子成熟过程中珠被发育成种皮，外珠被发育成外种皮，内珠被发育成内种皮。但在发育过程中，最常见的也是最规律的现象是内珠被消失，也有外珠被消失，或者内外珠被界线消失，合成一个或局部合生。

例如豆科植物为多层性的双珠被型，发育过程主要是外珠被外层分化为许多层次，内层颓废或黏液化；内珠被往往消失或残存颓废层。外珠被的具体变化是：外表皮分化为1列表皮栅状细胞（种脐区域为两层栅状细胞）；薄壁组织发育为下皮支持细胞（骨细胞），及其下腔隙薄壁细胞组成的营养层，如绿豆、决明子、大豆。

再如十字花科植物也为双珠被型，胚珠发育成种子过程中，外珠被发育成外种皮，具体变化是：外珠被的外表皮发育成黏液层，薄壁组织发育成下皮（包括表皮下薄壁组织、巨细胞、厚角细胞）或颓废，内表皮发育成杯状细胞（栅状细胞）；内珠被发育成内种皮，具体变化是：内珠被的外表皮发育成内种皮的外表皮或颓废，薄壁组织颓废，内珠被的内表皮发育成色素层或颓废。

种子类药材横切面着重观察种皮的构造。其次注意外胚乳、胚乳及子叶细胞的形态及所含贮藏物。

种皮表皮层注意表皮细胞的形状、大小、排列情况、壁有无增厚或木化、有无内含物等。通常为1列薄壁性细胞（牵牛子、鸦胆子）；有的有气孔（核桃仁）；有的部分细胞形成非腺毛（牵牛子）或全部分化为厚壁性的非腺毛（马钱子）；有的有腺毛（急性子）；有的表皮由薄壁细胞与石细胞组成（杏仁、桃仁）；有的全为石细胞（五味子、天仙子、枸杞子、栀子）；有的表皮为黏液细胞组成的黏液层（芥子等十字花科种子、车前子）；有的为栅状细胞（决明子等豆科种子、青葙子）；有的胞腔内含色素（巴豆）或结晶（芝麻），有的表皮下还有下皮（芥子、车前子、牵牛子）。

种皮表皮以下的组织可能有：①栅状细胞层：注意栅状细胞层数、大小、壁增厚情况及有无光辉带。②油细胞层：注意油细胞的形状、大小、分布及内含物颜色。③色素层：注意色素细胞层数及内含物颜色。④石细胞：注意分布、形状、大小及壁厚。⑤纤维：注意分布、形状、大小及壁厚。⑥支持细胞：注意形状、大小、壁增厚情况。

种皮内表皮层通常为1列薄壁细胞，有的为厚壁细胞（五味子）。注意细胞形状、大小、壁厚及有无色素。

种子的外胚乳、内胚乳或子叶细胞的形状、细胞壁增厚状况，以及所含脂肪油、糊粉粒或淀粉粒等，

也有鉴别意义。

（2）粉末特征：主要有种皮碎片，纤维，石细胞，结晶及胚乳，胚的薄壁细胞等。

注意种皮表皮碎片的表面观及断面观形态特征，如决明子为表皮栅栏状的细胞，表面观呈多角形，稍皱缩；断面观呈狭长方形，壁稍厚，有上下两条光辉带。枸杞子为石细胞，表面观呈不规则形，垂周壁波状弯曲并增厚；断面观内壁及垂周壁成谷形增厚。

不同的种子粉末中可能出现栅状细胞（豆科，牵牛子，菟丝子），杯状细胞（十字花科），支持细胞（豆科），石细胞（五味子，枸杞子），纤维，分泌组织（牵牛子有分泌腔），结晶（决明子有簇晶，青葙子有方晶），硅质块（槟榔，砂仁），色素细胞（豆蔻，砂仁），镶嵌状细胞（荔枝核），网状细胞（使君子，诃子），星状细胞（木鳖子）等，注意其形态特征。

胚及胚乳薄壁组织，注意其所含贮藏物的形状、大小。糊粉粒一般细小，较大的可见拟球体或拟晶体，有的拟晶体较大（肉豆蔻），也有糊粉粒中含细小簇晶（小茴香）。淀粉粒较少见，一般细小，偶见较大的，如芡实的淀粉粒为球状复粒，由多至数百个分粒组成。

10. 全草类药材 大多为草本植物的地上部分，少数为带根的全株。全草类包括了草本植物药的各个部位，其显微鉴别可参照以上各类药材的鉴别特征。

11. 菌类药材 大多以子实体或菌核的形式入药，无淀粉粒和高等植物的显微特征。观察时应注意菌丝的形状、有无分枝、颜色、大小（如茯苓）；团块、孢子的形态；结晶的有无及形态、大小与类型（如灵芝）。

二、动物类中药的显微鉴别原理

动物类中药来源于动物的全体、动物体的一部分、动物的生理、病理产物以及动物的加工品等。从动物的物种来看包括从高等动物到低等动物，物种范围广泛，种间差别较大。因而动物类中药的显微鉴别难以像植物类中药那样归纳出较多的共性内容。但是，动物类中药显微鉴别的基本原理还是基于动物的细胞、组织及器官的显微构造差异。

（一）组织特征

1. 肌肉组织 根据肌肉组织形态的不同可分为横纹肌、平滑肌及心肌三大类，动物药中以横纹肌为多。脊椎动物和节肢动物的骨骼肌都是由横纹肌构成的。从整体看，一块肌肉有许多肌纤维束，每束由许多肌纤维（肌细胞）组成，肌纤维是横纹肌的结构单元，呈圆柱状，具有多核，其外被有肌纤维膜。在高倍显微镜下观察，肌纤维的肌浆（或叫肌质，即肌细胞的细胞质）中，有很多沿着肌纤维长轴平行排列的肌原纤维。肌原纤维上有很多明暗相同的条纹，称明带和暗带，相邻肌原纤维的明暗带常在同一位置，因而整条纤维呈现出横纹。

动物粉末鉴别时，肌纤维的横断面及纵断面均可见。横断面观察单个肌纤维或肌纤维束的断面，注意其形状及大小；纵断面观察肌纤维的宽度，肌原纤维上明带及暗带的宽度，以及相邻肌原纤维明暗带的位置变化，即横纹平整或呈波状（如海马的横纹肌纤维有较平直的明暗相间的条纹，蛤蚧的横纹肌纤维有平行的波峰状或细波状明暗相间条纹）。

2. 骨组织 骨可分密质骨与骨松质两种。长骨大部分由密质骨组成，短骨和不规则骨的外表只有一层极薄的密质骨。观察长骨横截面磨片，在低倍镜下可见许多圆形或椭圆形的同心环状结构，即骨单位（哈弗系统，Haversian system），其中中空的腔即中央管（哈弗管）。每个骨单位通常由数层骨板（由骨胶纤维平行排列埋在钙质化的基质中形成）组成，它们包在中央管的周围，称哈弗板。在长骨横截面的外方和内方可见多层环列的外环骨板和内环骨板。在骨板或骨间板之间有许多椭圆形腔隙，称骨陷窝，正常情况下骨细胞充满于骨陷窝中，在高倍镜下可见骨间板和每个骨单位交界的地方有闪光

的黏合线分隔，骨陷窝向各个方向伸出很多分枝细管，即骨小管，它们可以穿过骨板，同邻近骨陷窝的管相联络。骨小管终止在黏合线处，不通入相邻的骨间板。

3. 皮肤 皮肤由表皮、真皮和皮下组织组成。表皮为复层角质化上皮，从内向外可分为基底层、棘状层、颗粒层及角质层。真皮紧接在表皮下，比表皮厚得多，与表皮相接的真皮部分有许多乳头状突起嵌入表皮。皮下组织连接真皮与肌肉间的疏松结缔组织，通常含有大量的脂肪细胞，其中有交织成网状的胶原纤维。

皮肤粉末显微鉴别时，不易辨别表皮、真皮及其分层，但可从有无色素颗粒、色素颗粒的排列形式来鉴别。如驴皮表面可见深褐色色素颗粒，鹿皮则无。

4. 毛（发） 毛（发）是哺乳动物特有的表皮角质化产物，包括毛尖、杆、根三部分。哺乳动物的毛发由角化的上皮细胞组成，可分为髓质、皮质和毛小皮。

髓是毛的轴心，有2 ~ 3列不完全角化的方形细胞组成网状结构。在显微观察时，看不清细胞及内含物，可见网状结构，不同的毛，其髓质大小及网纹不同，注意髓质连续或不连续，及其网状结构的形态特征。

皮质为毛的主部，由纵列的梭形角化细胞组成，细胞中含有黑色素粒或其他色素粒，色素有时弥散在细胞质中。有的梭形细胞彼此易散离，如驴毛；有的梭形细胞不易散离，如鹿毛。

毛小皮是在毛发外面一层完全角化的透明角板，呈小鳞片状，纵断面呈锯齿状。

5. 角 角为皮肤的衍生物，由头部表皮或真皮骨化形成或两者组合而成。洞角横截面观察，中央为骨组织，周围为角质部分，有明显而细密的波状纹理。实角由真皮骨化后伸出皮肤形成，如鹿茸横切面中央为骨组织，占横切面的极大部分，可分为中央管及其周围的骨板，骨板间可见骨陷窝、骨小管，外为皮肤，毛茸基部（毛根）埋于真皮中。

6. 节肢动物的体壁 体被厚而坚硬的几丁质体壁是节肢动物的特点之一。体壁通常由上皮、基膜及表皮三部分组成。上皮是一层多角形的活细胞层（皮细胞层），它向内分泌一层薄的基膜，向外分泌出一层厚的表皮。表皮分三层，从内到外依次是内表皮、外表皮及上表皮，内外表皮间常纵贯许多微细孔道。内表皮厚而无色，上表皮很薄，主为蜡层，外表皮质坚硬，并具黑色素，所以颜色较暗，多呈红棕色，一般表面还具有纹理，是重要的鉴定点，如全蝎体壁碎片呈棕黄色或黄绿色，外表皮表面观呈多角形网格样纹理，大多排列整齐，表面散布细小颗粒及毛窝；蜈蚣体壁碎片呈黄棕色或淡黄棕色，外表皮表面观有多角形网格样纹理，排列整齐，其下散布细小圆孔。

（二）粉末特征

1. 横纹肌 横断面观可见单个肌纤维或纤维束的断面，注意其形状和大小；l/2纵断面观可见肌纤维的宽度、肌原纤维上明带和暗带的宽度，以及相邻肌原纤维明暗带的位置变化。

2. 骨组织 从骨碎片的横断面和纵断面均可观察到骨的组织结构特征。横断面主要注意观察中央管的形状和直径、骨板的层次、骨间板的多少、骨陷窝的形状及大小、骨小管的多少等；纵断面主要注意观察中央管的纵列情况、骨陷窝多呈梭形、骨小管明显等。

3. 皮肤 注意有无色素颗粒及其排列方式。

4. 毛发 毛发的特征在鉴别不同动物时常常作为重要的参考。不同种动物毛的髓质大小及网纹不同，要注意观察髓质连续与否和网状结构的形态特征；要注意皮质的梭形细胞的大小、有无色素颗粒及其颜色、分布方式等。

5. 角 注意观察角碎片的横断面特征，区别是骨质角还是角质角，有无同心纹理或波状纹理及色素颗粒等。

6. 节肢动物的体壁 注意观察体壁外表皮表面观特征，如外表皮的颜色、表面纹理、排列方式、有无附着物及毛基等。



三、矿物类中药的显微鉴别原理

除龙骨等少数化石类药材外，一般无植（动）物性显微特征。矿物的显微鉴别适用于矿物的磨片、细粒集合体的矿物以及矿物粉末。透明的矿物利用透射偏光显微镜，不透明的矿物利用反射偏光显微镜。主要注意晶体的大小、直径或长径；晶形的棱角、锐角或钝角；色泽、透明度、表面纹理及方向、光洁度；偏光显微镜下的特征等。



第三章　中药显微鉴别的方法

一、取　样

参见《中华人民共和国药典》2005版一部附录相关项下。

二、制　片

显微制片的方法主要有表面制片法、粉末制片法和组织制片法等。在实际工作中，根据观察对象和目的，选择不同的显微制片方法。对植物类中药，如根、根茎、茎藤、皮、叶等，一般制作横切片观察，必要时制作纵切片；果实、种子类须制作横切片及纵切片观察；木类药材须制作横切片、径向纵切片及切向纵切片三个面观察。观察粉末特征时，制作粉末片。

具体制片方法参见中国药品生物制品检定所编《中国药品检验操作规程（2005年版）》的“显微鉴别法”项下。

三、显微观察

显微鉴别是一门专门技术，主要是利用显微镜观察植（动）物药材内部的细胞、组织构造及细胞后含物，明确显微特征，达到鉴定目的。

（一）显微镜

光学显微镜是进行显微观察的主要仪器，主要由机械部分与光学部分组成。机械部分包括镜座、镜臂、镜筒、载物台、物镜转换器、焦距调节装置等。光学部分包括光源装置、光密度调节装置、物镜、目镜等（图1）。

此外还有偏振光显微镜（简称偏光显微镜polarizing microscope），用于检测具有双折射性的物质，如纤维丝、纺锤体、胶原、染色体等，其与普通显微镜不同的是：其光源前有偏振片（起偏振器），使进入显微镜的光线为偏振光，镜筒中装有另一偏振片（检偏振器，一个偏振方向与起偏振器垂直的起偏器），这种显微镜的载物台是可以旋转的，当载物台上放入单折射的物质时，无论如何旋转载物台，由于两个偏振片是垂直的，显微镜里看不到光线，而放入双折射性物质时，由于光线通过这类物质时发生偏转，因此旋转载物台便能检测到这种物体。在偏光显微镜下，药材的鉴别要素在色彩上表现出一定的变化，可作为大多数植物、动物、矿物类药材的显微鉴别依据之一。如植物的淀粉在偏光显微镜下呈现黑十字现象，不同类型的淀粉其黑十字形象不同（图2）；草酸钙结晶类型多样，在偏光显微镜下呈不同的多彩颜色（图2）；石细胞在植物体内广泛分布，其细胞壁在偏光显微镜下呈亮黄色或亮橙黄色；纤维、导管在偏光显微镜下则呈强弱不同的色彩；动物的骨碎片、肌纤维、结晶状物、毛茸

等也呈现出不同的偏光特性；矿物类物质多具有偏光特性。

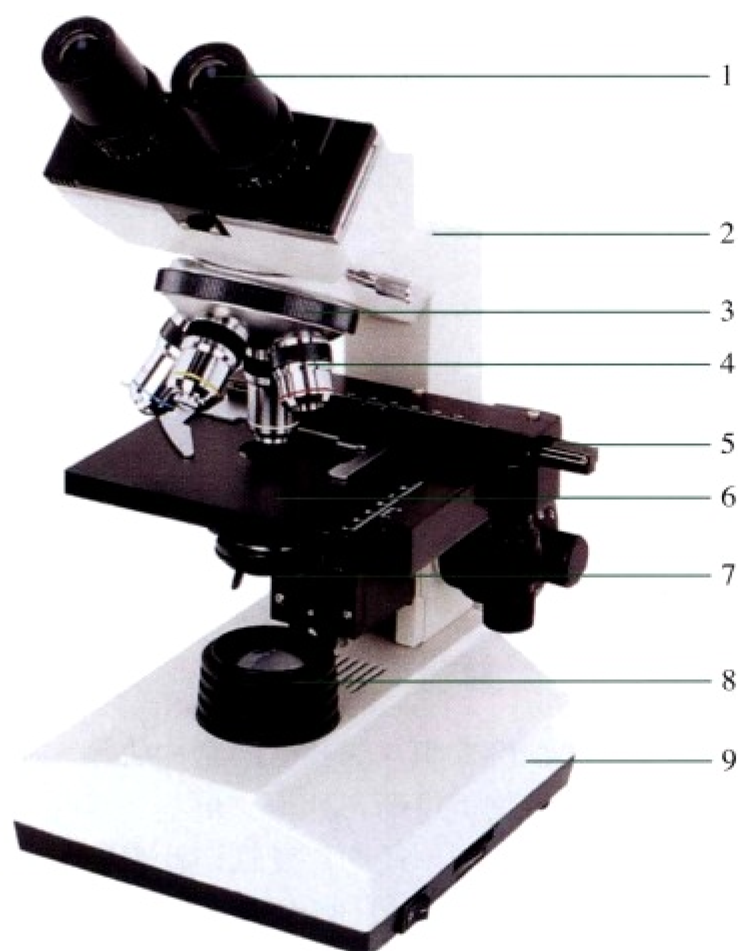


图1 显微镜

1. 目镜 2. 镜臂 3. 物镜转换器 4. 物镜 5. 玻片移动装置
6. 载物台 7. 聚光镜 8. 光源 9. 镜座

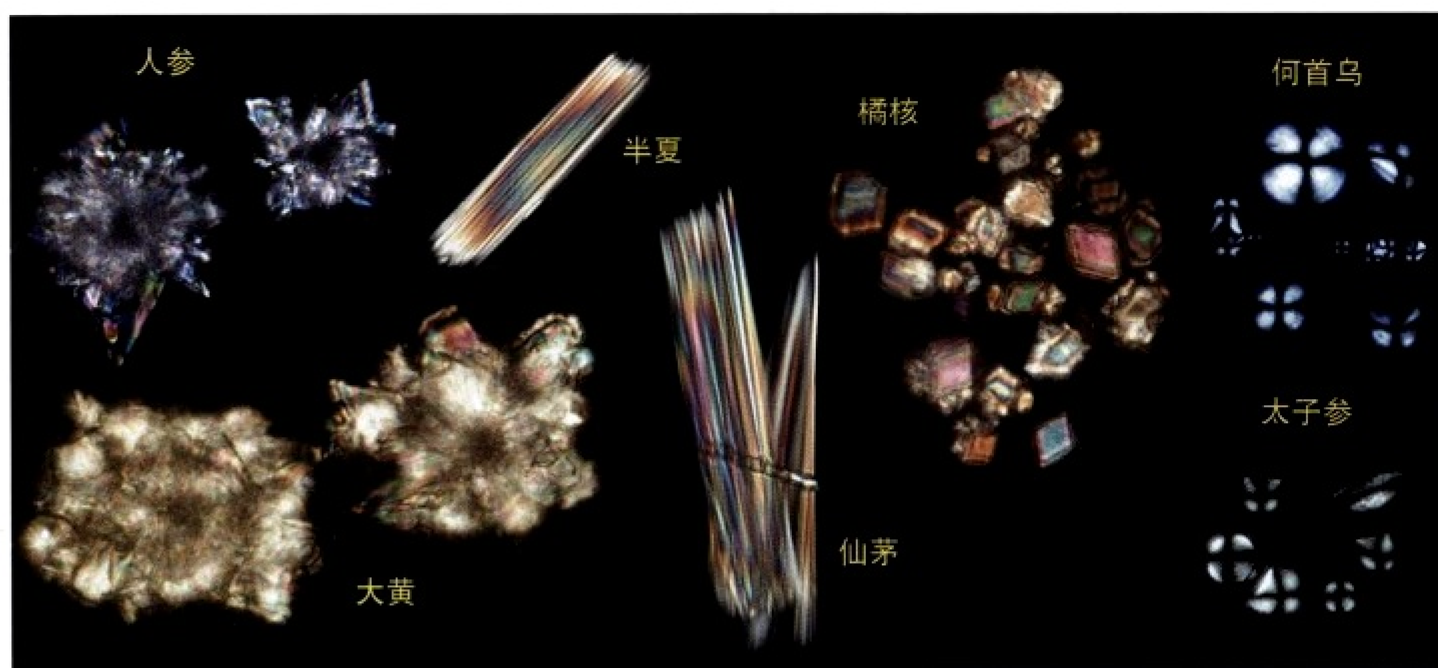


图2 草酸钙结晶及淀粉粒在偏光显微镜下的图像

另外，扫描电子显微镜（简称扫描电镜）分辨率高，放大倍率5～100 000，能使物质的图像呈现显著的表面立体结构（三维空间）的特征，观察的样品制备操作又较简易，所以在药材鉴定，特别在同科属不同种间的表面结构比较上，已成为一种新的手段。如扫描电子显微镜用于研究花粉粒（图3）、种皮

和果皮的表面纹饰，茎、叶表皮组织的结构（毛茸、腺体、气孔、角质层、蜡层、分泌物等），个别组织和细胞（管胞、导管、纤维、石细胞）的细微特征，木类药材的解剖以及动物体壁、鳞片及毛等的鉴别。

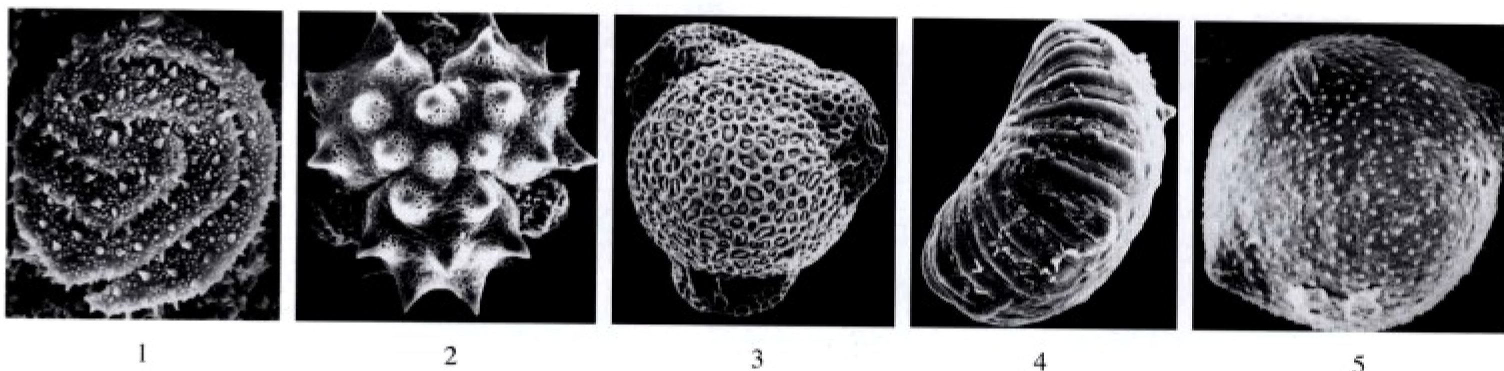


图3 电子显微镜下花粉粒的形态
1. 谷精草 2. 野菊花 3. 栝楼 4. 远志 5. 金银花

（二）显微观察与结果记录

一般进行显微鉴别时，每个样品至少制5枚标准片，先重点观察后，再纵向扫描观察30行，每次观察幅宽约0.5mm（有的显微镜可通过自动移动装置控制）。各种显微特征的量度测定，一般应取20个测量其平均值，力求客观。

1. 组织特征的观察与描述 组织特征特别是横切面组织特征的观察与描述，一般是由外向内依次进行，如双子叶植物茎的初生构造由外向内依次为表皮、皮层和中柱三个部分。

在观察与描述中，首先注意其各部分的位置、形态、有无其他组织分布等特征。其次应注意各种细胞及其内含物的颜色、形状、大小。颜色是指在显微镜下所见到的颜色。形状一般指在显微切片中所见到的平面形状。大小指在显微镜下用目镜测微尺测量的数据，一般取直径（椭圆形、长方形均量短径），如长度有鉴别意义，可加长度数据；导管、分泌细胞的直径常指外径；分泌腔、分泌道的直径常指内径；当目的物的大小差异很小时，可记载1个数字，如直径约50μm，当目的物的大小有一定差距时，可记载最小值与最大值，如直径为15～40μm(50μm)，括号内的数字表示少数目的物的大小数字；若目的物的大小差距很大时，可记载最小值、常见值和最大值，如长20～40～80μm。

2. 粉末特征的观察与描述 粉末制片在显微镜下观察时，可见到多种组织碎片、细胞及后含物的特征。描述方法同上，在描述顺序上，一般可以按照“先多后少”或“先特殊后一般”的原则进行。

3. 显微测量 显微测量是指在显微镜下用目镜测微尺测量细胞和后含物的大小。先将目镜测微尺用载台测微尺标化，计算出每一小格的μm数，应用时将测得目的物的小格数，乘以每一小格的μm数，即得所欲测定物的大小。测量微细物体时宜在高倍镜下进行，因在高倍镜下目镜测微尺的每一格的μm数较少，测得的结果比较准确，而测量较大物体时可在低倍镜下进行。现已有计算机显微图像采集处理软件可直接读取各类测量数据。

4. 结果记录 显微鉴别结果的记录，除用文字描述之外，还需附图说明。附图可以用显微绘图法绘制，也可以应用显微摄影采集图像。显微摄影是利用显微照相设备将显微镜下观察的影像摄录下来的一项技术。显微照相设备种类很多，可分为无测光系统和有测光系统或自动、手动系统。数码显微摄影技术是一项新的显微摄影技术，其工作原理与数码相机类似，只是其电荷耦合器件图像传感器（charge couple device，CCD）直接安装在显微镜上（图4）。显微镜上方的CCD将显微镜下看到的图像，转变为数字信号输出，通过相关的计算机图像采集软件直接显示在计算机显示器上，使显微镜中观察的图像即时生成，方便存储、编辑，并且色彩真实、立体感强，能够真实地再现显微镜下所观察到的细胞组织构造，较之传统的显微摄影具有明显的优势，逐渐成为获取显微特征图的主要技术手段。下面对数码显微摄影技术作简要介绍。

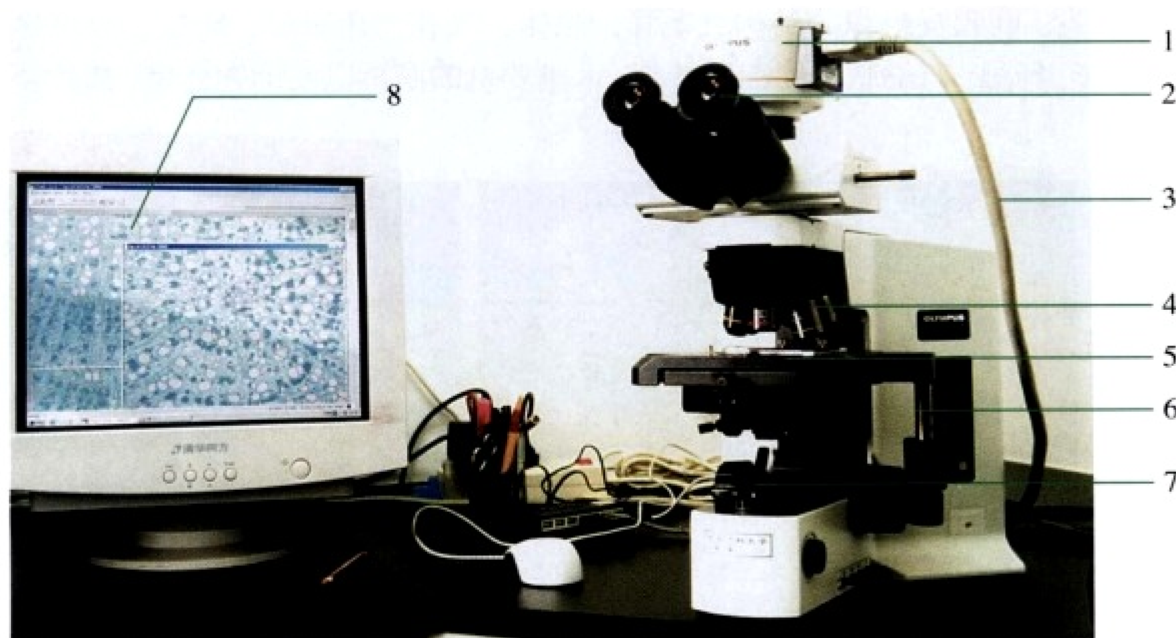


图4 数码显微摄影装置

1. CCD 2. 目镜 3. 数字信号线 4. 物镜 5. 载物台 6. 载物台移动杆 7. 聚光镜 8. 显示器

（1）数字视频信息获取卡　在数码显微摄影中，向计算机输入视频信息的一个重要部件是数字视频信息获取卡（Video Grabber）。视频信息获取卡有多种，视频信息获取与显示功能基本相同，其主要性能指标为：①可支持3个视频信号，从中选择其一进行输入；②PAL/NTSC/SECAM等制式可选；③可在VGA显示器上的一个可移动、可改变大小的窗口中实时播放接受的视频信号；④可以在视频图像画面上叠加计算机生成的文字与图形；⑤可调节视频图像的色调、饱和度、亮度及对比度；⑥可随时定格（冻格）正在播放的视频图像，并选择某种文件格式（如TIF、BMP、MMP、JPEG、Targa等）进行存储；⑦提供声音输入输出，可输入和播放电视伴音。

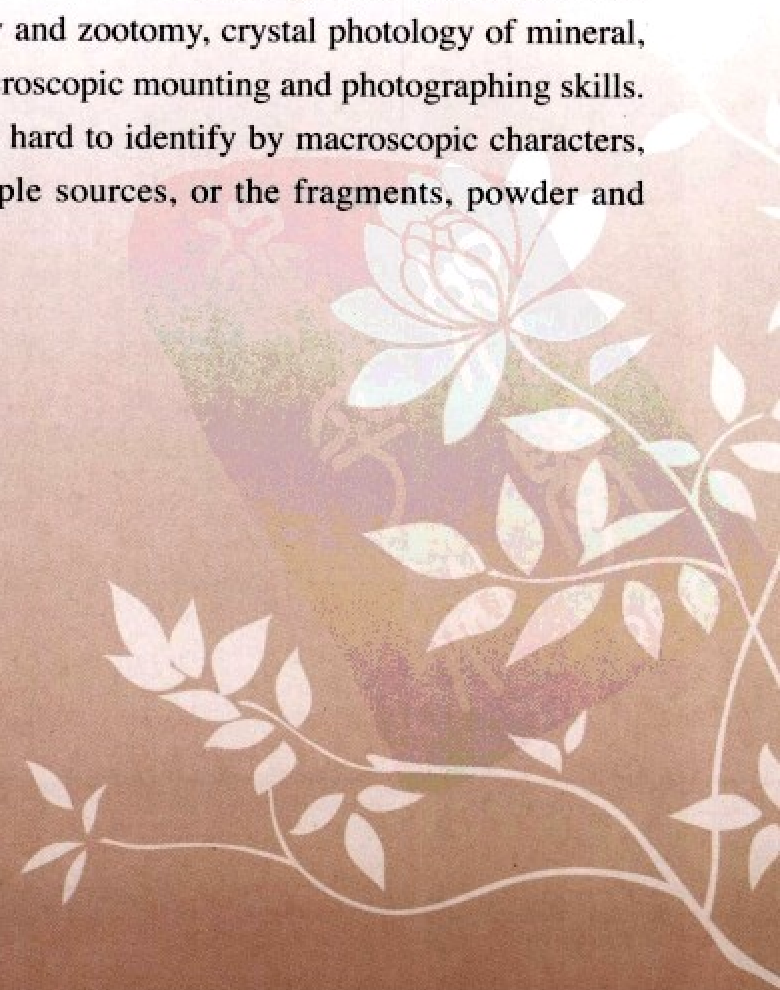
（2）数码显微图像的获取　以Olympus（DP50）显微数码照相为例，介绍数码显微照相的一般方法步骤：①打开取景器；②调整显微镜的光路到照相的光路；③打开预览开关按钮；④设置拍摄影像的模式（A.选择常光模式或荧光模式；B.选择自动模式或手动模式；C.选择拍摄影像的大小，可选择2776×2074，1392×1040和640×480分辨率）；⑤设置成像范围，选择光点曝光表的大小；⑥调整样本的取景范围及焦距；⑦移动光点曝光表到样本上测光，调节曝光值（该软件手动模式曝光值的设置范围1/10000～60S）；⑧调节白平衡（White balance，WB），用偏光或荧光拍摄时需要调节黑平衡（Black balance，BB），调节黑平衡时，应在关闭光圈的情况下进行；⑨拍摄图像，根据实验要求选取优质清晰的图像进行拍摄；⑩检查所拍摄图像的质量，保存图像，即对文件命名，指定文件格式与路径。

（3）在数码显微摄影中应注意的问题：①设定白平衡：根据拍摄对象，预先校正白平衡，防止所拍摄图像出现偏色；②选择曝光时间：手动曝光时，通常选用曝光时间在1/240～1/30S之间；③选择曝光模式，常用的曝光模式有：手动/自动（Fine/Quick），Fine模式下能得到质量优良的图像，但在观察活体标本时则优先选择Quick模式，此时，快速捕捉模式得到的图像质量会更好；④选择图像大小：一般的软件均有3个可供选择图像大小的参数，其中分辨率大则图像所占空间就大，反之则小；⑤捕捉与保存图像：选择质量好的图像及时捕捉，保存图像时要指定文件格式、保存路径等；⑥注意放大倍率和标尺的选择：不同物镜下所拍摄的图像放大倍率是不同的，其标尺也不同，因此选择相应的标尺，确保拍摄图像的科学性。

（4）图像处理：数字技术在图像领域的应用，无限地增大了图片后期制作的空间。掌握数字图像后期的处理技巧，能使图像质量上一个台阶。Adobe Photoshop是非常实用而有效的图像处理软件，可以对图像进行裁剪，调整图像的大小，修补图像的不足（包括修补曝光的过度或不足、消除图像中的噪点等），以及颜色的校正等。具体操作方法可参阅相关专业书籍。

General Introduction

Microscopic identification is a method using a microscope to identify the characters of tissues, cells and ergastic substances in Chinese Materia Medica (CMM) and their preparations so as to determine their authenticity. Being a very important method for the identification of CMM, the microscopic identification requires operator wide knowledge of a variety of subjects, such as phytotomy and zootomy, crystal photology of mineral, microscopic phytochemistry, as well as microscopic mounting and photographing skills. It is often applied to the CMMs which are hard to identify by macroscopic characters, or difficult to distinguish from the multiple sources, or the fragments, powder and preparations of CMM.







Chapter One Brief development history of microscopic identification

In 1838, Schleiden, a German scholar, firstly clarified that cell is the basic unit of plant, and observed the microscopic structures of several crude drugs using microscope. In 1857, he published a book named *Grundniss der Pharmakognosie des Pflanzen-reiches* which described the microscopic structures of a number of herbal drugs. This book could be used as the solid foundation for the accurate identification of crude drugs from different resources. Since then, microscopic identification of crude drugs further developed and became one of important identification methods. *Besides, Anatomischer Atlas*, written by J. Moeller, a German scientist, in 1892, described the microscopic characters of major powdered drugs of plants in German Pharmacopoeia; *Introduction of the Analysis of Drugs and Medicines* recorded the work of the English scientist B.E. Nelson on study of microscopic characters of powdered crude drugs from 1900 to 1907, and introduced the method of microscopic analysis of powdered crude drugs with delicate characteristic pictures. Moreover, Nelson compiled a detailed key by category in this book for 197 crude drugs. In 1916, the English biologist Wallis established the quantitative microscopic analysis by using *Lycopodium spore* as reference standard, which promoted the development of purity identification of powdered crude drugs and also developed a series of microscopic quantitative parameters （e.g. palisade ratio, stomatal index, vein-islet number） thereafter. Several years later, the most famous monograph of powdered crude drugs in earlier period came out as *The Microanalysis of Powdered Vegetable Drugs*, （the 2nd edition）, written by a American scholar A. Schneider in 1921. This publication described in detail the methodology on the study of powdered botanical drugs, including general notes, operating methods, microscopic descriptions and listing of the key, etc. It documented 210 species of powdered crude drugs in total, with their illustrated microscopic characters. Nowadays, more and more national pharmacopoeias document the microscopic identification item of crude drugs, e.g. 65 species in the Japanese Pharmacopoeia of 2001, 36 in the US Pharmacopoeia of 2004, 119 in the British Pharmacopoeia of 2004, and 115 in the European Pharmacopoeia of 2005 as well.

The course of *Pharmacognosy of Powdered Crude Drug* had its debut in the pharmaceutical curriculum published by the Ministry of Education in 1912, and the subject was set up in the National School of Pharmacy in the late 30' s of last century, but little study was practically carried out in this field. Prof. Xu Guojun published his work named *"Identification key of 101 species of powdered crude drugs"* （*North-China Drug News*, volume 3 （6） and, volume 4 （1））, which contained more than 40 crude drugs in China. The monograph called *Microscopic Identification of Powdered Drugs was* published subsequently, in which 100 powdered crude drugs were documented with verbal descriptions and illustrations. Later on, the study of powder identification of crude drugs composed of Chinese patent medicine （CPM） was further put through according to the composition of CPM called San-Dian pill recorded in the Chinese Pharmacopoeia of 1977 edition, volume one. It contributed thereafter to the publication of monograph named *Microscopic Identification of Powdered Chinese Materia Medica*, in which 380 species of CMM with their illustrated descriptions of powder characters were documented.



The microscopic identification of CPM in China could be traced ever since at 1948 when Guan Guangdi, a Chinese scholar, published his microscopical research results in *Drug News in* 1948, volume 6, in which he identified the powder of *Baoxianzi* in the package of *Yunnan White Drug* to make sure its source as the seed of plant from *Datura* of Solanaceae. Afterwards with the requirement of production and quality control of drugs, the microscopic identification of CPM gradually progressed. In 1956, Prof. Xu Guojun applied the powder identification method to the identification work of a CPM called "Nanjing Lingyingsha Drug", and found that it contained Moschus, Venenum Bufonis, Rhizoma Gastrodiae, Herba Ephedrae, Radix et Rhizoma Glycyrrhizae, Rhizoma Atractylodis, Flos Caryophylli, Radix et Rhizoma Rhei, Realgar, Cinnabar, etc. He published the results in "Bulletin of Chinese Materia Medica" volume 2 (4), and this book was consequently considered as the pioneer of microscopic identification applied to CPM. Based on the established method, 18 papers on the study of commercial CPMs such Banbei pill, Zuojin pill, Xianglian pill, etc. were published in his group, hereafter. From 1973 to 1975, Nanjing College of Pharmacy, cooperated with the Pharmacopoeia Commission of PRC and some other institutions, accomplished studies on the microscopic identification of more than 66 CPMs such as Shihu Yeguang pill, together with 154 powdered crude drugs composed of these CPMs. The results were later summarized in the document of scientific reports of Nanjing College of Pharmacy in 1977. Early in 1975, entrusted by the Pharmacopoeia Commission of PRC, Nanjing College of Pharmacy held a meeting to communicate on the microscopic identification of CPM, while the experts attended the meeting, reexamined around a hundred of CPM's microscopic identification items drafted by different institutions around the country. These results filled in the blank of C.P. on the microscopic identification of CPM. Till then, there were 179 CPMs, out of 270 in the C.P. (1977 edition), which documented the corresponding microscopic identification items, up to 66.3%. *Microscopic analysis of CPM* was thereafter published in 1997 by China Pharmaceutical University, including illustrated descriptions of microscopic identification of 200 CPMs.

With the development of research work on microscopic identification (MI) in China, C.P. gradually increased the microscopic identification item on Chinese crude drugs and their formulated products, summarizing in the following table.

Chinese Pharmacopoeia	Numbers of total CMM	Numbers of CMM with MI item	Ratio (%)	Numbers of total CPM	Numbers of CPM with MI item	Ratio (%)
1977 edition	745	257	34.5	270	179	66.3
1985 edition	459	213	46.4	207	158	76.3
1990 edition	497	248	49.9	248	171	69.0
1995 edition	508	295	58.1	359	234	65.2
2000 edition	536	303	56.5	409	247	61.4
2005 edition	551	335	60.8	517	273	52.8

From the brief introduction above, one could see the overall picture of microscopic identification with a quite long history. The crude drugs documented in national pharmacopoeia and national formula were mainly addressed, with the purpose of preventing from adulteration and counterfeit so as to ensure their quality. In China, research of microscopic identification started in 1951, but a systemic study in this field initiated after 1960. At present, the microscopical identification has become one of important methods for the identification of CMM and CPM in Chinese pharmacopeia.

Chapter Two Principles of Microscopic Identification of CMM

Plants, animals and minerals, as the sources of CMM have different microscopic structures corresponding to their species, and based on each feature the CMM could be accurately identified. The microscopic identification of CMM is a method using a microscope to observe and record the characters of structural features and to fulfil the identification of species from which the CMM is derived due to these differences.

Part I Principle of Microscopic Identification of CMM from Plant Origins

Applying the microtechnique with knowledge of plant morphology and anatomy, species could be identified by observing and measuring the characters of cells, tissues and ergastic substances in CMM samples.

(I) Characters of cells and ergastic substances

Cell is the basic unit of morphology and structures of plant as well as its vital movement. Typical plant cell is composed of cell wall, protoplast, ergastic substances and physiological active substances. The microscopic identification is usually based on cells and their ergastic substances.

Characters of cells involving their shape, color, texture on surface as well as the thickening condition of cell wall, appearance of pit, are of great importance in microscopic identification. The ergastic substances as follows are also of essential identification value: starch grains (usually contained in all kinds of parenchymatous cells), aleurone grains and fatty oil (usually in endosperm cells of seeds), volatile oil (usually in oil cells), mucilages (usually in mucilage cells), inulin (often in kinds of parenchymatous cells), crystals of calcium oxalate (raphide, cluster, prism, sandy and columnar crystals), crystals of calcium carbonate (also called as cytolite), silica crystals, crystals of aurantiamarin, etc.

(II) Characters of tissues

Tissue is defined as groups of cells which have the same origin, similar appearance and function and in close conjunction with each other. There are six types of plants tissues as meristem, fundamental tissue, protective tissue, secretory tissue, mechanical tissue and conducting tissue. The latter 5 types are derived from meristem and thereby called as mature tissue. Identification of CMM is usually based on the characters of tissues together with specialized cells. For protective tissue, note types of stomata and structure of stomatal apparatuses, as well as the glandular hairs, non-glandular hairs, types of glandular scales. For secretory tissue, note shapes and construction of laticiferous tubes, resin canals, oil ducts, oil cavities and oil cells. Besides, the fibres and stone cells are commonly differentiated in mechanical tissue, concerning with shape and structure. When observing the conducting tissue, it should be noted with the shape and structure of vessels, tracheids, sieve vessels and sieve cells, and as well the differentiation and types of stele and vascular system.



(III) Characters of organs

Note the tissue alignment and structure of the morphological organs as root, rhizome, stem, bark, leaf, flower, fruit and seed.

(IV) Application of characters of cells, ergastic substances, tissues, and organs in the identification of CMM

1. CMM of root origin

(1) Tissue structures: majority of them are roots of angiosperm, which could be distinguished, as primary or secondary structures of dicotyledonous roots or monocotyledonous roots, according to the characters of vascular tissue.

Most roots of dicotyledons are in the formation of secondary structure, which is composed of the following tissues: cork tissue at external; narrow secondary cortex; broad or relatively narrow phloem; usually obvious cambium ring; xylem consisted of vessels, tracheids, xylem fibres, xylem parenchyma and rays; pith absence usually (e.g. Radix et Rhizoma Glycyrrhizae), seldom with evident pith (e.g. Radix et Rhizoma Gentianae, Radix Aconiti).

A few dicotyledonous roots are in the formation of primary structures, which are composed of broad cortex, small stele and usually absence of pith (e.g. Radix et Rhizoma Asari). The stele consists of a few xylem and phloem bundles, interrupted arranged and the primary xylem takes the shape of asterism.

Abnormal structures, i.e. the tertiary structures are also present in some crude drugs of dicotyledonous roots. For example, Radix Polygoni Multiflori has a numbers of abnormal compound vascular bundles outside the cambium ring; Radix Achyranthis Bidentatae show layers of concentric vascular bundles. The tertiary structures are also presented in Radix Phytolaccae, Radix Adenophorae and Radix Euphorbiae Ebracteolatae. In addition, roots of *Atropa belladonna* L. and Radix Physochlainae possess included phloem (i.e. interxylary phloem).

Roots of monocotyledons usually had no cork tissue, showing the following structures: the outer walls of epidermis cells thickened sometimes or developed into layers of velamina cells after suberization or lignification; cortex broad, occupying most portion; endodermis usually with characteristic Casparian dots (or strips); stele small; many bundles of xylem and phloem, interrupted arranged in a ring; pith in the centre as parenchyma cells (e.g. Radix Stemonae), sometimes with cells of lignified thickening walls (e.g. Radix Liriope, and Rhizoma Smilacis Chinae).

Secretory tissues that usually present in roots, involving laticiferous tube, resin canal, oil cavity or duct and oil cell, etc. are mostly distributed in phloem. Different forms of crystals of calcium oxalate, e.g. the clusters, prisms, sandy crystals and raphides, etc., are commonly encountered. In addition, the presence and appearance of fibres, stone cells, starch grains, inulin, which also need attention, are often of considerable diagnostic importance for identification.

(2) Characters of powder: all kinds of cells and tissue fragments but mesophyll tissue may present. Cork tissue of roots is frequently observed, and the shape, color and wall thickness require more attention. Vessels are often relative large, showing modifications of types, diameter, the length of its elements, the perforate pits of end wall as well as the appearances and arrangement of pits. Stone cells show characteristics on shape, size, thickened cell walls, and various appearances of pits, density of pit-canals. When fibre is observed, its shape, length, width, thickening condition of cell wall, types of pits, appearances and arrangement of pit-canals are

of diagnostic importance. The cells around fibre, at the mean time, in which crystals may be contained, should also be paid more attention since they may form the crystal fibre. Secretory tissue, involving secretory cell, secretory cavity (chamber), secretory duct (tube) and laticiferous tube, differentiate in types, shapes as well as the color of secretion, arrangement of cells around, etc. Crystals, usually being as calcium oxalate, as well as inulin and silica crystal, etc., show characteristics in type, size, arrangement and appearance of crystal cells. Starch grains, usually small, are presented with differentiations to which should be noted when observing, in amount, shape, type, size, shape and position of hilum as well as striation.

The root stock of the root drugs is sometimes accompanied with petiole, residue of stem or fine hairs. The powder is thus found in some other corresponding characters, suchas epidermis, stomata and hair.

2. CMM of rhizome origin

(1) Tissue structures: Most are the underground stems of angiosperma, including root stocks (rhizomes), stem tubers, bulbs and corms. Rhizome is frequently seen, and could be distinguished by the types of stele and vascular bundles from that of pteridophyte, dicotyledons or monocotyledons.

Outer part of rhizome of pteridophyte is usually composed of a layer of closely fitting cells with thickened walls and hypoblast. Parenchyma is relatively developed. Types of stele include protostele, amphiphloic siphonostele and dictyostele. Protostele consists of xylem (only with tracheid) in the centre and phloem around, then pericycle and endodermis outside (e.g. rhizome of *Lygodium japonicum* Sw.). Xylem of amphiphloic siphonostele is cylinder, and presented with phloem and endodermis both inside and outside (e.g. Rhizoma Cibotii). Dictyostele consists of several meristeles, which present the same structure of protostele, arranged interrupted in a ring in transverse section (e.g. Rhizoma Dryoperidis Crassirhizomatis). The shape and margin of scales on the surface of rhizome are also of certain identification value (e.g. Rhizoma Drynariae).

Rhizomes of dicotyledons are usually composed of cork tissues or stone cells in cork (e.g. Rhizoma Atractylodis and Rhizoma Atractylodis Macrocephalae); cortex, sometimes with root trace vascular bundles visible; stele in type of unlimited collateral bundles, arranged in a ring; pith in the central part (e.g. Rhizoma Coptidis). Some present the tertiary structure, showing abnormal compound vascular bundles in pith (e.g. Radix et Rhizoma Rhei).

Rhizomes of monocotyledons are, however, composed of the following tissues: epidermis at the outermost; cortex with leaf trace bundles; mostly obvious endodermis except for relatively bulky rhizomes and tubers; and limited collateral bundles or amphivasal vascular bundles scattered in stele (e.g. Rhizoma Acori Tatarinowii). Stomata are visible on the epidermis of scale leaf from bulb.

Some crude drugs derived from rhizomes are present with oil cavities (e.g. Rhizoma Chuanxiong, Rhizoma Atractylodis and Rhizoma Atractylodis Macrocephalae) or oil cells (e.g. Rhizoma Acori Tatarinowii, Rhizoma Cyperi); and raphides of calcium oxalate often in mucilage cells (e.g. Rhizoma Arisaematis, Rhizoma Pinelliae, Rhizoma Gastrodiae, Rhizoma Bletillae, Rhizoma Polygonati, Rhizoma Polygonati Odorati, etc.). Apart from the characters mentioned above, sclerenchyma, types of vessels and crystals of calcium oxalate should also be noted.

(2) Characters of powder: Similar to root drugs. Large amounts of starch grains often occurred in bulbs, stem tubers and corms. The shape, size, hilum, striation and types of grains involving the compound grains, semi-compound grains and multi-hilum in simple grain are all important identifying characteristics. Stomata are usually visible in epidermis of scale leaf from bulb. Vessels in annular type are frequently visible in rhizome of monocotyledons whilst tracheids visible only in that of pteridophyte.



3. CMM of caulis and stem origin

(1) Tissue structures: most are derived from herbaceous or woody stems of dicotyledons, and some from stems of monocotyledons. The differentiations show in types and arrangements of vascular bundles.

For herbaceous stems of dicotyledons, epidermis often occurred. Note the cell shape, thickened out-wall, stoma and hair, etc. Cortex is in primary formation and its lateral layers are usually differentiated into collenchyma; pericycle frequently differentiated into fibres or scattered with stone cells; pascicular cambium obvious; secondary phloem present in bundles or plates; pith broad (e.g. Herba Menthae).

Woody stems of dicotyledons are composed of the following tissues: cork giving rise externally to secondary cortex; sclerenchyma of pericycle arranged continuously in a ring or interruptedly; cambium obvious; secondary phloem and secondary xylem showing cylinder structure; relatively narrow rays formed by cells with lignified walls; pith small (e.g. Ramulus Cinnamomi). Woody climber stems of dicotyledons present relatively thick cork, accompanied with rhytidome sometimes; vascular tissue showing radiative arrangement separated by rays; wide diameter of vessels (e.g. Caulis Aristolochiae Manshuriensis); sclerenchymatous cells surrounding pith or abnormal structures of vascular bundles in pith (e.g. Caulis Piperis Kadsurae).

In addition, note presence of the secretory tissue, crystals of calcium oxalate, starch grains, resins and pigments, etc.

The stems of monocotyledons are covered by epidermis externally, followed by hypodermis, if present, consisted of sclerenchymatous cells as the identifying feature. Limited collateral bundles scatter in fundamental tissues but yet pith absence (e.g. Caulis Dendrobii).

Stems of gymnosperm are composed of tracheid in xylem, usually without vessels. However, stem of *Herba Ephedrae* is an exception, for it has the similar structure to herbaceous stem of dicotyledons.

(2) Powder characters: all kinds of tissues but mesophyll could be possibly present.

4. CMM of bark origin

(1) Tissue structures: Bark crude drugs consist of all tissues outside the cambium, involving cork tissue, cortex and phloem. For cork tissue, layer number of cork cells, color and the degree of thickened cell walls should be paid special attention. Some distinct variations also occur to cork. For example, Cortex Eucommiae thickened in the inner wall of cork cells, Cortex Cinnamomi thickened in the parietal and lateral walls of cork cells in innermost layer. Rhytidome is visible in some old bark (e.g. Cortex Lycii, Cortex Eucommiae). Cortex narrow, usually derived from phelloderm as the secondary cortex. Phloem occupies most part of the bark, separated by rays throughout till dividing line of phloem and cortex. It should be noted that the characteristics of rays, such as width (numbers of cell lines), shape of cells, thickness of wall, pits, containments, etc. Sclerenchyma (fibres and stone cells) often occurred in phloem and cortex (e.g. Cortex Mori and Cortex Phellodendri Chinensis). Sometimes fibres and stone cells aggregate tangentially to form several layers and strips (called as hard phloem), arranged separated by groups of sieve vessels and parenchyma tissue (called as soft phloem), such as Cortex Eucommiae and Cortex Fraxini.

Drugs from bark usually contain the characters of resins, oil cells, laticiferous vessels and crystals of calcium oxalate. Most contain starch grains, though very fine.

(2) Characters of power: mainly include cork cell, fibre, stone cell, secretory tissue and crystals of calcium oxalate, etc. Sieve area in compounding sieve plate at the apex is usually visible, as well as that in lateral wall of sieve cell in plants of pine family (e.g. Cortex pseudolaricis). Generally, no tissue from xylem is visible, such as vessels and tracheids, etc.

5. CMM of wood origin

Wood mainly consists of the secondary tissues (lumber) produced by the cambium, on its inner surface, of stems and roots of xylophyta. Heartwood is the common part for medical use. The secondary xylem is generally composed of vessels, tracheids, fibres and xylem parenchymatous cells in axial system, and xylem parenchymatous cells of rays in radial system.

(1) Tissue structures: Three sections are usually observed for the drugs consisted of wood. Transverse section is required when observing the width of xylem ray (i.e. lines of cells), density, proportion and distribution pattern of vessels and xylem parenchymatous cells, shape of vessels and xylem fibres and their diameters, etc.; tangential longitudinal section on the other hand shows the width (number of cells in the widest part of the fusiform ray in radial section), height (number of cells from up to down) and types of xylem rays as well as the vessels and xylem fibres at the same time. Radial longitudind section shows xylem rays, taking form of transverse band which is in vertical with the axial vessels, concerning with height and types of cells (i.e. homocellular ray or heterocellular ray). Vessels, detailed in types, length, diameter and tyloses present or not, as well as xylem fibre, detailed in types, size, and thickness of wall, pits are also the observation features (e.g. Lignum Aquilariae Resinatum).

Vessels of wood CMM often present bordered pits. Xylem fibres are divided into two types as libriform fibre and fiber tracheid. The former shows wall lignified with none or simple oblique pits and the latter is with bordered pits. Ray cells and parenchymatous cells are usually lignified with pits. Special variations would occur to some drugs. For instance, Lignum Aquilariae Resinatum has the tissue of included phloem with non-lignified cell walls but yet presence of columnar crystals of calcium oxalate; Lignum Cinnamomi Camphorae has oil cells; and Lignum Santali Albi has secretory cells in tubiform, together with prisms of calcium oxalate forming the fibre with crystal sheath. For gymnosperm drugs, tracheid and xylem ray cells are the main characters for identification.

(2) Characters of power: morphological characters of vessel, xylem fibre, xylem parenchymatous cells, xylem ray cells and their ergastic substances are the main points for identification.

6. CMM of leave origin

(1) Tissue structures: transverse section slides are often mounted to observe the structures of epidermis, mesophyll and vein, noting the upper and lower epidermis concerning with shape, size, outer wall, stomata, thickness of cuticle, and presence or absence of containments, especially the characteristics of trichome. Cytolite, contained in some epidermis (e.g. Herba Andrographis), and convex papilate, in outer walls of upper and lower epidermis (e.g. upper epidermis of lotus leaf and lower epidermis of Epimedium sagittatum) are also diagnostic features. When observing the mesophyll, note cells in palisade tissue, concerning with shape, layers, proportion and distribution, together with the presence or absence of stone cells and secretory cells. For example, Folium Sennae shows palisade tissues in both surfaces; leaves of *Atropa belladonna* L. show layers of crystal cells below palisade tissue. Laticiferous tube distributed in tissues of Folium Mori. Large stone cells are present in mesophyll of tea leaves.

(2) Surface slides of leaves: mainly note the epidermis cells, stomata, appearances of types of trichome, and some diagnostic features of mesophyll tissue such as types of crystals of calcium oxalate and their distribution, etc. Pay attention to the shape of upper and lower epidermis cells, anticlinal walls, cuticle striations and types of stomata. Trichome is one of important identifying characters, noting the non-glandular hair and glandular hair concerning with their cell shape, thickness of cell wall and characteristics on surface. Plant from Compositae generally show specific non-glandular hairs whose apex cells extended in level direction, and



several short cells connected in the middle, forming the shape of "T" . The length of right and left arms of the apex cells is of diagnostic value. Glandular hairs of plants from Labiatae specified in spheroid head which is composed of eight cells, covered by cuticle, and short simple cell as the stalk, in formation of glandular scale. The diameter and color of head and stalk are the diagnostic points.

Moreover, when observing the surface slides of leaves, do some counting and calculating such as palisade ratio, stomatal number, stomatal index, and vein-islet number, since those are all of diagnostic importance to some extent, especially in the identification of plants with close relationship.

(3) Charactors of power: generally similar to the characters of surface slides and yet often present with broken trichome; transverse fragments of leaf blade and crystals visible sometimes.

7. CMM of flower origin

Based on the different part of the herb, bract, calyx, corolla, stamen and pistil are often prepared to surface slide respectively, or made into a surface slide of entire flower for observation. The structure of bract and calyx are similar to leaf. Corolla are usually present with papilla or villiform prominence in outer walls of upper epidermis cells, and some show oil cavities (e.g. Flos Caryophylli) or secretory cells in tube form (e.g. Flos Carthami). Trichome in epidermis of corolla is also important diagnostic point. Different species in *Lonicera* is a typical case that they could be identified by differentiation of trichome. Anther sac of androecium often show reticulate, strip form or punctiform thickening in inner walls of cells, and mostly lignified. Pollen grains are important identifying characters in CMM of flower origin, which should be noted with shape, size, germination aperture, sculpture outside, etc. (e.g. pollen grains of Flos Carthami show exine dentatespinose; and Flos Lonicerae Japonicae presents detailed and close needles with fine grain round sculpture in outer walls of pollen grains.) Epidermis cells of pillar of gynaecium, esp. the cells at the apex, usually show convex papilate or differentiate to villiform (e.g. Stigma Croci).

When observing the powdered flower, pollen grains, inner wall cells of anther sac, non-glandular hairs, glandular hairs are all major diagnostic features, crystals of calcium oxalate, secretory tissue and pigment cells should be noted as well.

8. CMM of fruit origin

(1) Tissue structures: characters of pericarp would often be observed. Pericarp of true fruit, derived and multiplied from ovary wall, could be divided into three parts as exocarp, mesocarp and endocarp.

Exocarp is the outermost tissue of pericarp, resembling the lower epidermis of leaves, showing one layer of epidermis cells and therefore requires the similar noting points as those of leaves for observation. Mesocarp located between exocarp and endocarp, resembling the mesophyll of leaves. The fine vascular bundles among mesocarp usually present inside are most collateral, some bicollateral or combination of two collateral ones as well. Secretory tissue and sclerenchyma are also often distributed in mesocarp. Endocarp varied much since some are one layer of parenchymatous cells whilst some are scattered with stone cells or layers of crystal cells, etc.

Because of the high differentiation of pericarp, true fruit is all not distinguished as exocarp, mesocarp and endocarp obviously. Meanwhile, the false fruit, which is derived from the ovary hypostasy, doesn' t show clear line between carp and other tissues.

(2) Characters of powder: Note fragments of pericarp epidermis, parenchyma cells from mesocarp and fibres, stone cells, crystals, etc. Cork tissue, fragment of leaves, pollen grains and large vessels are all absence.

When observing exocarp, note the shape and thickening degree of anticlinal wall of cells, cuticle texture and presence of non-glandular hair, glandular hair and their characteristics. Mesocarp showed characters in

parenchymatous cells with shape, thickening condition and presence of secretory tissue, crystals of calcium oxalate, starch grains and pigment substances, etc.

Stone cells of pericarp are usually distributed in groups or scattered singly. Note the shape, size, thickness of walls, pit and pit-canals, striations. Some contain brown masses (e.g. Fructus Chaenomelis), some contain crystals (e.g. Prisms and clusters are present in powder of Fructus Gleditsiae Abnormalis).

Pericarp fibres are usually in bundles or in overlapped arrangement. Note the color, length, diameter, wall thickness, pits and pit-canals. Some short fibres are similar to stone cells, e.g. Fructus Forsythiae; some presented as crystal fibre, e.g. Fructus Gleditsiae Abnormalis. Crystals are often of prisms and clusters, seldom present sandy crystal. Note the shape and size of crystals.

Apart from what mentioned above, note the presence of inlay cells and fragments of epidermis from endocarp for observation.

If the CMM derived from fruit containing seeds, fragments of testa, endosperm and embryonal tissue could also be visible, referring to the microscopic identification of seed CMM in detail.

9. CMM of seed origin

(1) Tissue structures: Structures in anatomy of testa show diversity. Despite that some are homoeotypic in entire family, such as Umbelliferae and Compositae, testa, more often varies much in anatomy even in the same family.

Structure of testa is determined by numbers and thickness of integument and arrays of vascular bundles, as well as the variations during maturing process in integument. All of monocotyledon and most archichlamydeae of dicotyledons are in the type of bi-integument; whilst metachlamydeae of dicotyledons are in mono-integument type. If arranged according to family, then both types exist in considerable number of families. Three-tier-integument also exists in few families, and so does non-integument testa.

During the maturing process of seeds, integument develops into testa, outer integument to exotesta and inner integument to endotesta finally. However, as known for common sense and also in accordance with the nature law, inner integument may appear missing. Sometimes outer integument missed or the division line of external and inner integument became obsolescent, yielding concrescent or partially concreted tissue.

Take leguminous plants as examples in which the integument is multiple layer's in bi-integument types. In process of maturing, outer layer of outer integument developed into many layers while the inner one deteriorated or mucificated; inner integument, however, often disappears or shows residue of deterioration. The variation of outer integument occurs as follows: external epidermis differentiated into one layer of palisade cells of epidermis (two layers present in hilum area); parenchyma, otherwise developed to brace cells of hypodermis (i.e. bone cells) and nutritive layer consisted of parenchymatous cells in lacouna below. Mung bean, Semen Cassiae and soyabean are the examples of this type.

Take crucifer plant as another example in which integument also belongs to the bi-integument type. During the maturing process, outer integument developed to exotesta at last, showing the variation in detail as follows: external epidermis of outer integument developed to slime layer, and parenchyma developed to hypodermis (including parenchyma of hypodermis, giant cells and collenchyma cells) or deteriorated, then the endepidermis developed to caliciform cell (i.e. paliform cells). Inner integument is otherwise developed to endotesta, according to the detailed differentation as follows: exocuticula to external epidermis of endotesta or deteriorated, parenchyma deteriorated and internal epidermis of inner integument to layers of pigment or deterioration.

Note the testa structure first when observing the transverse section slide, then the prosembryum, endosperm



and cells of seminal leaf as well as the storing substances contained.

Shape, size, arrangement of epidermis cells and the thickening or lignification condition of cell walls and presence of containments are all of diagnostic importance when observing epidermis of testa. The epidermis usually shows one layer of parenchymatous cells (e.g. Semen Pharbitidis and Fructus Bruceae); some with stomata (e.g. Semen Juglandis); some differentiated to non-glandular hairs partially (e.g. Semen Pharbitidis) or to pachypleurous non-glandular hairs entirely (e.g. Semen Strychni); some with glandular hair (e.g. Semen Impatientis); some composed of parenchymatous cells and stone cells (e.g. Semen Armeniacae Amarum and Semen Persicae); some consisted all of stone cells (e.g. Fructus Schisandrea Chinensis, Semen Hyoscyami, Fructus Lycii and Fructus Gardeniae); some present slime layer formed by mucilage cells (e.g. seeds in Cruciferae as Semen Sinapis and Semen Plantaginis); some are paliform cells (e.g. seeds in Leguminosae as Semen Cassiae and Semen Celosiae); some contain pigment (e.g. Fructus Crotonis) and crystals (e.g. Semen Sesami); some show hypodermis below (e.g. Semen Sinapis, Semen Plantaginis, Semen Pharbitidis).

Tissues below epidermis of testa may involve as follows. ①Layers of paliform cells. Note layer numbers, size, thickening condition and presence of "light bands". ②Layers of oil cells. Note shape, size, and distribution of cells and color of containments. ③Pigment layer. Note layer number of pigment and color of containments. ④Stone cells. Note distribution, shape, size and thickness of walls. ⑤Fibres. Note distribution, shape, size and thickness of walls. ⑥Brace cells. Note shape, size and thickening condition.

The endepidermis of testa usually consists of one layer of parenchymatous cells, except some sclerenchymatous cells (e.g.Fructus Schisandrae Chinensis). Note the shape, size of cells and thickness of walls as well as the presence of pigment.

There are also some other identification characters in seeds, such as prosembryum, endosperm, shape of seminal leaf, thickening degree of cell walls and the containments like fatty oil, aleurone grains or starch grains, etc.

(2) Characters of powder: mainly visible with the fragments of testa, fibres, stone cells, crystals and endosperm, parenchymatous cells of embryonal, etc.

Note the fragments of epidermis of testa, focusing on characteristics in surface view and section appearances. For example, epidermis of Semen Cassiae is composed of paliform cells, showing polygon with relatively shrinkage in surface view. The transverse section, showing as long rectangle, thickened in walls of cells, with two "light bands". Take Fructus Lycii as another example. The epidermis of its testa is composed of stone cells, presenting irregular forms in surface view, anticlinal walls bent wavy and thickened; in the lateral section view, inner and anticlinal walls both thickened in grain form.

Different powders of seeds may contain various structural elements, such as paliform cells (e.g. such as crude drugs derived from leguminous plant, Semen Pharbitidis, Semen Cuscutae), caliciform cells (e.g. drugs from cruciferous plants), brace cells (e.g. drugs from leguminous plant), stone cells (e.g. Fructus Schisandrae Chinensis, Fruit Lycii), fibres, secretory tissues (e.g. oil cells in Fructus Amomi , and Fructus Amomi Rotundus, secretory cavity in Semen Pharbitidis), crystals (e.g. clusters in Semen Cassiae, prisms in Semen Celosiae), silica crystal (e.g. Semen Arecae and Fructus Amomi), pigment cells (e.g. Fructus Amorni and Fructus Amorni) mosaic cells (e.g. Semen Litchi), reticular cells (e.g. Fructus Quisqualis and Fructus Chebulae), stellate cells (e.g. Semen Momordicae), etc. Attentions should be paid to the appearances of what mentioned above.

For embryo and parenchymatous cells of endosperm, note the shape, size of containments. Aleurone grains are usually fine, the large ones show pseudo-spheroplast or pseudo-crystals in large shape occasionally (e.g. Semen Myristicae) and sometimes very fine clusters (e.g. Fructus Foeniculi). Starch grains are seldom

visible, fine in general but occasionally large, such as those of Semen Euryales which are the compound grains in globular form, composed of up to hundreds of simple grains.

10. CMM of entire herb origin

Most are from aerial parts of herbal plants, a few are the entire herbs with roots. Entire herb include all parts of herbaceous plants, thus its microscopic identification could be carried out by referring to characters in all parts of various CMM described above.

11. CMM of fungi origin

Fruit body and sclerote of fungi are the common parts for medicinal use. Their microscopic characters are therefore presented with no starch or any of those of higher plant. When observing, note the shape, branches, color and size of hyphae (e.g. Poria); appearance of masses and spores; presence or absence of crystals, for if present, special attention goes to its form, size and type (e.g. Ganoderma).

Part II Principle of Microscopic Identification of CMM from animal origins

CMM originated from animals are the dried bodies of whole or part, or physiological and pathological products, or some processed ones of animals. The species of animals cover very broad ranges, both in higher and lower classes, and differ greatly from one to another. Therefore, the microscopic identifications of animal CMM could not be summarized to some common features as those of plant CMM. However, based on the different structure of cells, tissues and organs of animals in microscopic aspect, identifications could still be applied.

(I) Tissue characters

1. Muscular tissue

According to the appearances, muscular tissue could be divided into three types as striated muscle, smooth muscle and cardiac muscle among which the first one is mostly used in the animal drugs since the skeletal muscle of vertebrate and arthropodan are all composed of the striated muscle. In general view, a piece of muscle consists of many muscular bundles, each of which is composed of lots of muscle fibers (or muscle cells). The muscle fibers are the structure unit of striated muscle, appearing as circular cylinder and polynuclear, covered by myolemma. When observed under high power microscope, muscle plasma (or named as myoplasm, i.e. cytoplasm in muscle cell) of muscle fibers will show many muscular fibrils arranged in parallel going along the long axis aspects. Layers of light and dark stripes are presented in muscular fibril, named as light band and dark band. Because the consecutive light and dark bands are usually presented in the same position, the whole fibre shows striations.

When identifying the powdered CMM from animal origins, transverse section and longitudinal section of muscle fibre are both visible. For the transverse section of single muscle fibre or muscular fibre bundles, note their shape and size; for the longitudinal section, note width of fibre, width of light and dark band and position variation of the consecutive bands, i.e. the level striations or wavy striations (e.g. Hippocampus show relatively straight strips of light and dark arranged alternately in striped muscle-fibre, and Concha Meretricis seu Cyclinae as another case, shows the parallel alternated strips with wave crest or fine waves.)

2. Bone tissue

Bones are classified as two types, namely dense bone and cancellous bone. Long bones are mostly composed of dense bone while short and irregular bones are covered with an extremely thin sheet of dense bone on the



surface. When observing the ground transverse section of long bones, many round or elliptical structures of concentric rings are visible under low power microscope, i.e. the osteon (Haversian system), with hollow cavity or called as central canal (canalis Haversi). Each osteon is usually composed of several layers of bone plates (formed by the bone collagen fibres arranged in parallel embedded in calcium ground-substance), which are named as Haversian plates, placed around central canals. Multilayer circumferential outer lamellae and endosteal lamellae present in transverse section of long bones, located in outer and inner part. Between the bone plates and interstitial lamella, many ellipse lacunae exist, usually named as bone lacunae, filled up with osseous cells. If observed under high power lens, the borderline of osteon and interstitial lamella may show flaring cement line abjunction. Numerals branchlets of tubulus stretch into all directions, yielding bone canaliculi, which could go through bone plates and be in conjunction with tubulus of surrounding bone lacunae, but terminate in the cement line yet not go into the consecutive interstitial lamella.

3. Skin

Skin consists of epidermis, corium, and subcutaneous tissue. Epidermis is, as the keratinized epithelium tissue, composed of basal layer, acantho-layer, granular layer and cuticle layer from innermost to outermost layer. Corium is closely conjugated with epidermis but much thicker and present many convex papilates inserted into the epidermis in the conjunction. Subcutaneous tissue connects the corium with loose connective tissue between muscles, thus it usually contains large amounts of fatty cells and some collagen fibres interlaced to reticulum.

When carrying out microscopic identification of powdered skin, epidermis, corium and its layers could hardly be distinguished, but the presence of pigment granules and their arrangement pattern are of diagnostic value. For example, skin of donkey shows sable pigment granules on the surface, while no pigment is shown in skin of deer.

4. Hair

Hair is the diagnostic feature of mammals, derived of keratinized epidermis, involving three parts as hair apex, stalk and base. It is composed of epithelial cells after keratinization, and divided into medulla, cortical substance and hair cuticle.

Medulla is the core of hair, consisted of two to three partially keratinized square cells forming the reticulate structure which could be seen under microscope except for cells and their containments. Different hairs show different medulla size with varied reticulate texture. Note the continuity of medulla and the appearance characteristics of reticulate structure.

The main part of hair is cortical substance, composed of keratinized fusiform cells arranged vertically containing black or other color of pigment granules in or scattered in cytoplasm. Some fusiform cells are easy to be separated, e.g. donkey hair; some are difficult, e.g. deer hair.

Hair cuticle is a sheet of transparent plate which is completely keratinized covering outside hair, taking form of small scale-shaped and serration in longitudinal section.

5. Cornu

Cornu is the derivation of skin, derived from epidermis of head or ossification of cortical or the combination of the two. When observing the transverse section of horn (hallow cornu), bone tissue is shown in the center, surrounded by corneous part present obvious and fine wavy grain. Solid horn is otherwise derived from cortical in ossification, stretching out of skin. Take Cornu Cervi Pantotrichum for instance. The bone tissue, in the center of transverse section, occupies extremely large part. It is composed of central canals and surrounding

bone plates with bone lacunae, bone canaliculi. The outer part of the section slide is presented with corium, where the base of small hair embedded.

6. Body wall of arthropodous

Covering by thick and hard chitin, body wall is one of characters for arthropodan. The body wall usually consists of three parts as epithelium, basal membrane and epidermis. Epithelium is a layer of polygonal living cells (chrotoplast layer), giving rise externally to thin layer as basal membrane and internally to thick layer as epidermis. Epidermis consists of three layers, namely from inner to outer as endocuticle, exocuticle and epicuticula, and usually with many fine porous channels run vertically through the endocuticle and exocuticle. Endocuticle is thick and colorless; epicuticula is very thin, mainly composed of wax layer; and exocuticle is presented in firm texture, dark color usually brownish-red due to melanin, and frequently possessing striations on surface as an important identifying point. For example, the fragments of body wall of Scorpio show brownish-yellow or yellowish-green in color, polygonal reticular texture mostly well arranged in surface view of exocuticle, and covered with striations, scattered with fine particles and trichopore. Scolopendra shows yellowish-brown or light yellowish-brown in color of the fragments of body wall, and the surface view of its exocuticle shows well arranged polygonal reticular texture, scattered with fine rotunda beneath.

(II) Powder characters

1. Striated muscle

Fragment sections of singular fibre or muscle fibre bundles are visible in a view of transverse section, and the shape and size should be noted. In the view of half longitudinal section, width of muscle fibre, width of light and dark bands and their position variations of the consecutive bands are of diagnostic importance.

2. Bone tissue

Transverse and longitudinal section of fragments of bones are visible with structure characters. For transverse section, note the shape and diameter of central canals, layers of bone lamellae, numbers of interstitial lamellae, shape and size of bone lacunae, amount of bone canaliculi, etc. For longitudinal section, note arrangement of central canals, fusiform bone lacunae, and the obvious bone canaliculi, etc.

3. Skin

Note the presence of pigment granules and their arrangement.

4. Hair

Characters of hair are often of diagnostic importance when identifying different animals. The size of medulla and texture of hair vary with the species of animals. Note continuity of medulla and characteristics of reticular structure, together with the size of fusiform cells in cortical, presence of pigment granules and their color, distribution pattern if so, etc.

5. Cornu

Note the characteristics of fragments of transverse section, distinguishing bony cornu or horny one, in presence or absence of concentric striations, wavy striations and pigment granules, etc.

6. Body wall of arthropodan

Note the characteristics of exocuticle in surface view, such as the color, surface texture, arrangement, hesion, and base, etc.



Part III Principle of Microscopic Identification of CMM from mineral origin

Except for from a few fossils, such as Os Draconis, most of CMM from mineral origin do not have specified microscopic characters. Therefore the microscopic identification is suitable for the ground section, fine-grain aggregation and powder of minerals. Transmitted polarized microscope could be used for the translucent minerals, whilst the reflected polarized microscope for the opaque minerals. The characteristics of crystals are usually the main features for observation, focusing on its size, diameter, length, angularity, color and luster, transparency, striations and their directions on the surface, smoothness, and characteristics under polarized microscopic, etc.



Chapter Three Methods of CMM microscopic identification

Part I Sampling

See the corresponding items in appendix of Pharmacopoeia of PRC, 2005 edition, volume I.

Part II Mounting

Methods of mounting for microscopic slides involves slide of surface, powder and tissue, etc. In practical work, different method was chosen on different purpose using representative CMM. Transverse section slides are usually made for drug plants derived from root, rhizome, stem, bark, leaf, etc., longitudinal section slides are also made when necessary; for fruits and seeds, both transverse and longitudinal section slides are required to observe; and three aspects of slides as transverse, tangential longitudinal and radial longitudinal section are necessary for observation of wood. Besides, powder slides are often needed when observing the characters of powder.

The detailed procedures of mounting were introduced in microscopic identification items in the publication of *Standard Operation of Drug Inspection in China* (2005 edition), compiled by national institute for the control of pharmaceutical and biological products.

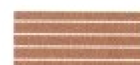
Part III Microscopic Observation

Microscopic identification is a specified technique using microscope to observe the cells, tissue structures and ergastic substances in medicinal plants (or animals), so as to observe the microscopic characters for species identification.

(I) Microscope

A light microscope, consisted of the mechanic part and optical part, is the main equipment to do the microscopic observation. The mechanic part includes base, arm, tube, stage, revolving nosepiece and focus adjusting assembly, etc. The optical part includes light source, optical density adjuster, objective, eyepiece etc. (Fig 1).

Besides the light microscope, there is polarizing microscope which is suitable for detection of birefringence materials such as cellosilk, spindle, collagen, chromatosome, etc. The sets differ from light microscope in that it was assembled with two polarization filters. A polarizer before the light source is applied to change the light into polarizing light into microscope, whilst the other one assembled in the tube as the analyzer to make



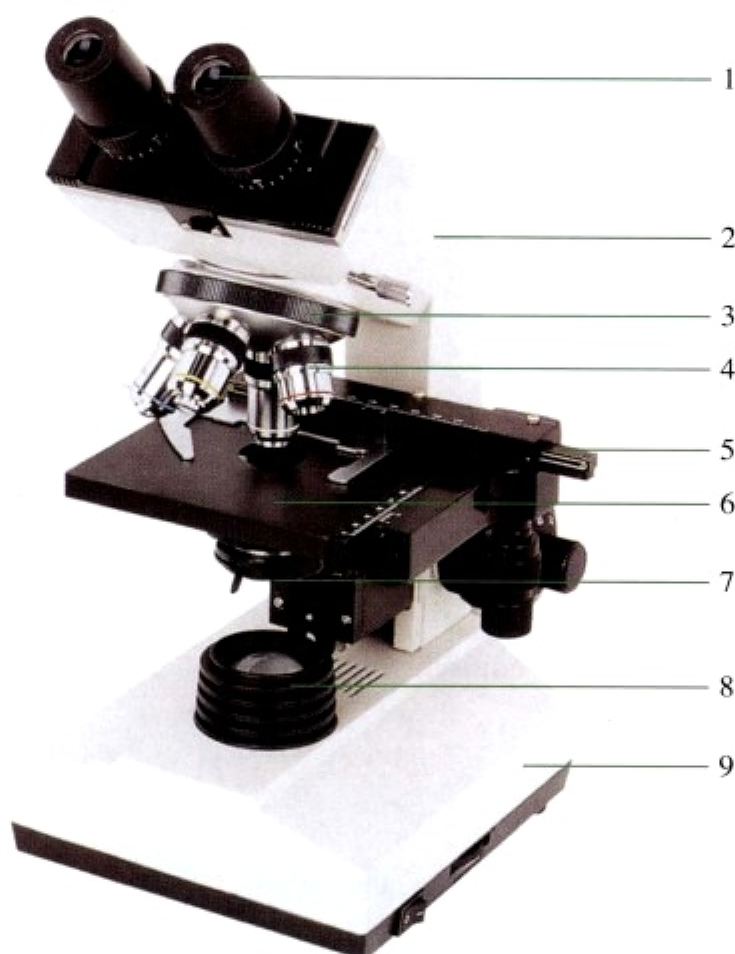


Fig 1 Microscope
1. eyepiece 2. arm 3. revolving nosepiece 4. objective
5. slide shifter 6. stage 7. condenser 8. light source 9. base

a vertical polarization direction. The stage of this microscope is free to rotate. When mono-refractive substance is on the stage, no matter how to rotate the stage, no light could get into microscope because of the two vertical polarization filters. When double refraction substance is on the stage, since light will inflect as going through, this substance could be detected by rotate stage within a proper position. The identification elements of CMM show some sense of color variations under polarizing microscope, which could be considered as one of microscopic identification points for most of CMM derived from plants, animals and minerals. Take starch in plant CMM as an example, it shows black cruciate shape under a polarizing microscope, varied with types presenting different shapes (Fig 2). Besides, the crystals of calcium oxalate present polychrome; stone cells distributed widely in plant tissues, show brilliant yellow or orange on the cell walls; fibers and vessels also show different detectable colors. The bone chips, muscle fibers, crystals, small hairs from animals present the polarizing characters in some cases as well. For the mineral material, most of them also have the polarizing characters.

In addition, scanning electron microscope (SEM) taking the advantage of high resolution, large amplification up to 5 ~ 100 000 times, as well as easy preparation of samples, has become a new method applied to the identification of CMM, esp. to the surface structures of interspecies because it could prominently show the stereochemical structures (in three-dimension) of the substance on surface. For example, the application of

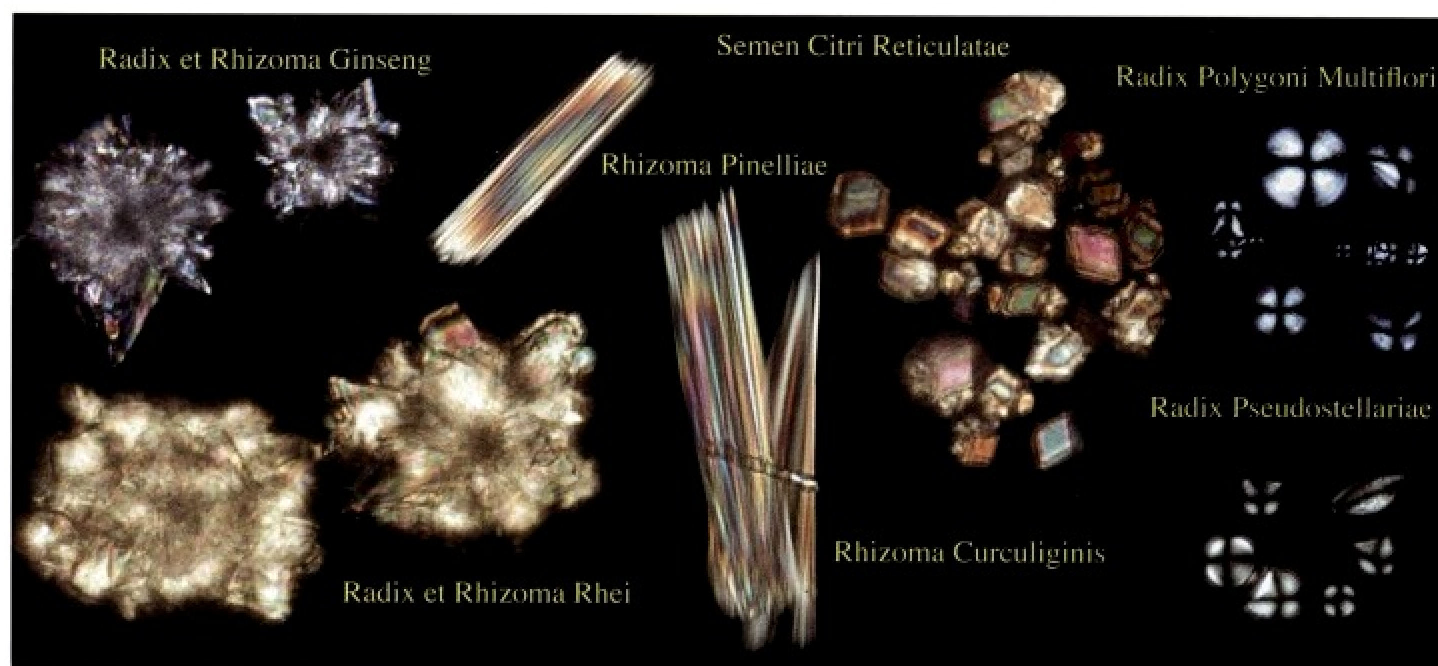
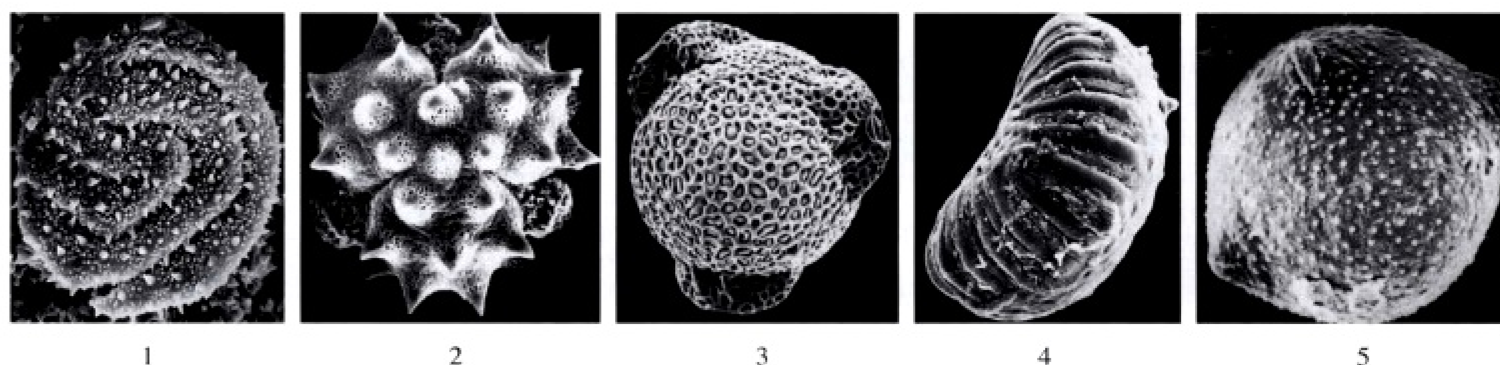


Fig 2 Crystals of calcium oxalate and starch grains under a polarizing microscope

SEM were reported as to the study of pollen grains (Fig. 3), surface ornamentations of testa and pericarp, tissue structures on surface of stems and leaves (hair, glandular organ, stoma, cuticule, wax, secretion, etc.), details of some tissues and cells (tracheid, vessel, fibre, stone cell) and dissections of wood, as well as to body walls, scales and hairs from animals.



1 2 3 4 5

Fig 3 Pollen grains under SEM

1. Flos Eriocauli 2. Flos Chrysanthemi Indici 3. Fructus Trichosanthis 4. Radix Polygalae 5. Flos Lonicerae Japonicae

(II) Microscopic observation and records of results

At least five standard plates for each specimens should be made. After observing with emphasis, then longitudinally scan 30 lines, 0.5mm per line (some could be controlled by auto-moving assembly), from up to down. The microscopic measurements of every character should be performed 20 times, and the average data were then recorded in order to achieve as much objective as possible.

1. Observation and description of the tissue characters

The tissue characters, esp. those of the transverse sections, are usually observed and described from outer to inner. Taking the primary structure of dicotyledonous stem as an example, epidermis, cortex and stele were displayed from outer to inner.

When observing and describing, firstly note the position, appearance and presence or absence of other tissues, then pay attention to different types of cells and their ergastic substances, focusing on the color, shape, size. Shape is restricted to the aspect of microscopic slice; color and size are to the results from those observed under a microscope. Microscopic measurements can be made using a stage micrometer in conjunction with an eyepiece to obtain often the diameter (short radialis for ellipse and rectangle; external diameter for vessel and secretory cell; whilst inner diameter for secretory cavity and canal), and added length if necessary. If the objective subject is little varied in size, only one number may be recorded, such as about 50μm in diameter. When a certain variation occurs, minimum and maximum values are required, e.g. 15 ~ 40μm (50μm) in diameter, indicating minority of value in brackets. When the objects vary greatly in size, minimum, frequent and maximum values should be recorded, e.g. 20 ~ 40 ~ 80μm in length.

2. Observation and description of the powder characters

Characters of the tissue fragments, cells and ergastic substances are frequently observed for the powder slides. The method of description is just the same as above, and the order to describe usually followed the principle of "first for the most" or "first for the diagnostic".

3. Microscopic measurement

Microscopic measurement refers to the determination of the size of cells and their ergastic substances using



an eyepiece micrometer under a microscope. Two scales are required, known as a stage micrometer and an eyepiece micrometer. The eyepiece micrometer is firstly standardized by the stage micrometer, determining the actual value of one division. Then the size of objects could be obtained by multiplying the counted number of divisions that the object occupied with the value of one division. To measure a minute object, high power lens is recommended because of the high accuracy yielding by the small value of one eyepiece division. For the same reason, the measurement of a relatively large object is usually processed using low power lens. Nowadays, the measuring data could be obtained directly with the help of some computer software for microscopic image processing.

4. Records of results

The records of microscopic identification should be illustrated by suitable sketches apart from the text description. The illustrations could be drawn by micro-chartography or acquired by microphotograph, which is a kind of technique taking a photograph under microscope by special devices. There are many types of microphotograph devices, mainly divided as absent or present surveying optical system and automatic or hand-motion system. The principle of the new camera technique as digital microscopic photography is just the same as digital camera while its charge couple device is directly assembled on microscope (Fig. 4) to change the image under microscope into digital signals to output and showing on the computer display unit by image processing software. Taking advantages of images immediate yielding, convenient storing and editing, and true color as well as strong stereo feeling, this technique shows prominent superiority over the orthodox one in literally presenting the tissue structure and cells appearances under microscope. Therefore, it has gradually become the main means to obtain diagnostic pictures of microscopic characteristics. Brief introduction is as follows.

(1) Video Grabber

As an important input device, video grabber is classified into many types but yet performing the same functions of acquisition and display of video information. The chief performance index are as follows: i) support 3 video signals, one of which is selected as input; ii) modes of PAL/NTSC/SECAM available; iii) a moveable and changeable window on VGA display to show real time video signals accepted; iv) be able to build up words and figures on images of video frame; v) hue, saturation, brightness and contrast of the image could be adjusted; vi) capture the live video frame easily at any time and save the image in a certain format (e.g. TIF, BMP, MMP, JPEG and Targa, etc.); vii) provide voice input and output and possible to input and play the accompanied sound.

(2) Capture digital microscopic pictures

Here take the software named Olympus (DP50) as an example to introduce the general operation procedure of digital microscopic photograph as follows: ① Open the viewfinder; ② Adjust the optical path of microscope to photographying; ③ Click the preview button; ④ Set the photo mode (A. in light mode or in fluorescence mode; B. auto mode or manual mode; C. the size of picture, in 2776 × 2074, 1392 × 1040 or 640 × 480 resolution); ⑤ Set the imaging area by choosing a proper exposal aperture; ⑥ Adjust the view area of sample and focus; ⑦ Move the exposure meter to samples and adjust the exposure value(from 1/10000 ~ 60 s manually); ⑧ Regulate the White balance (WB), and the Black balance (BB) when captureing under polarizing light or fluorescence with closed aperture; ⑨ Take the picture, according to requirements of experiments, e.g. clear with high quality, etc.; ⑩ Check the quality of acquired picture and save it with nomination in specify format and path.

(3) Tips and notes for microscopic digital photographing

The following item should be noted when taking pictures: ①WB. The WB should be setted previously before

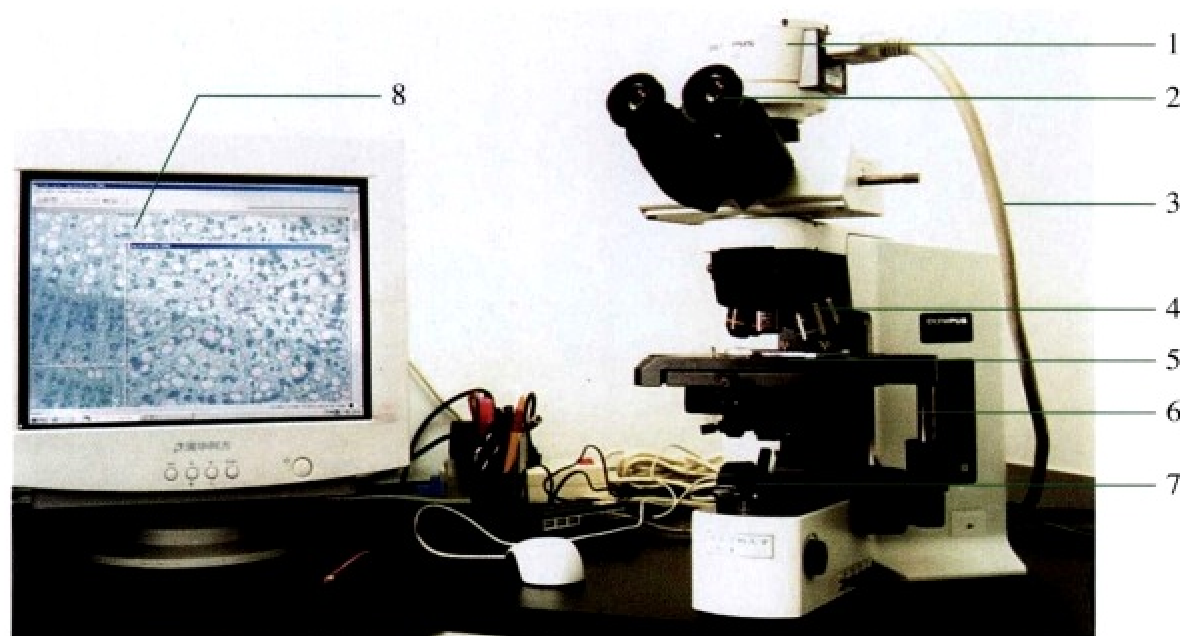


Fig 4 Digital microscopic photography devices

1. CCD 2. eyepiece 3. digital signal line 4. objective 5. stage 6. movement pole on stage 7. condenser 8. displayer

shooting so that the picture would present true color. ②Exposure Time. When in the manual mode, the exposure time are generally selected between 1/240 to 1/30S. ③Exposure Mode. Fine and Quick are two usual exposure modes. Fine mode is suitable for high quality picture, while the quick mode is more proper for live samples. ④Picture size. For most software, 3 types of size parameters are available. The higher resolution of the picture has, the larger size it will posses, and vice versa. ⑤Capturing and saving pictures. Capture the good pictures in time and save it with designation of format and path of the file. ⑥Attention to the magnification and scale. As magnifying power is different by types of object lens, the pictures should be supplied with corresponding different scales, so as to ensure the scientificity of the photoing.

(4) Image processing

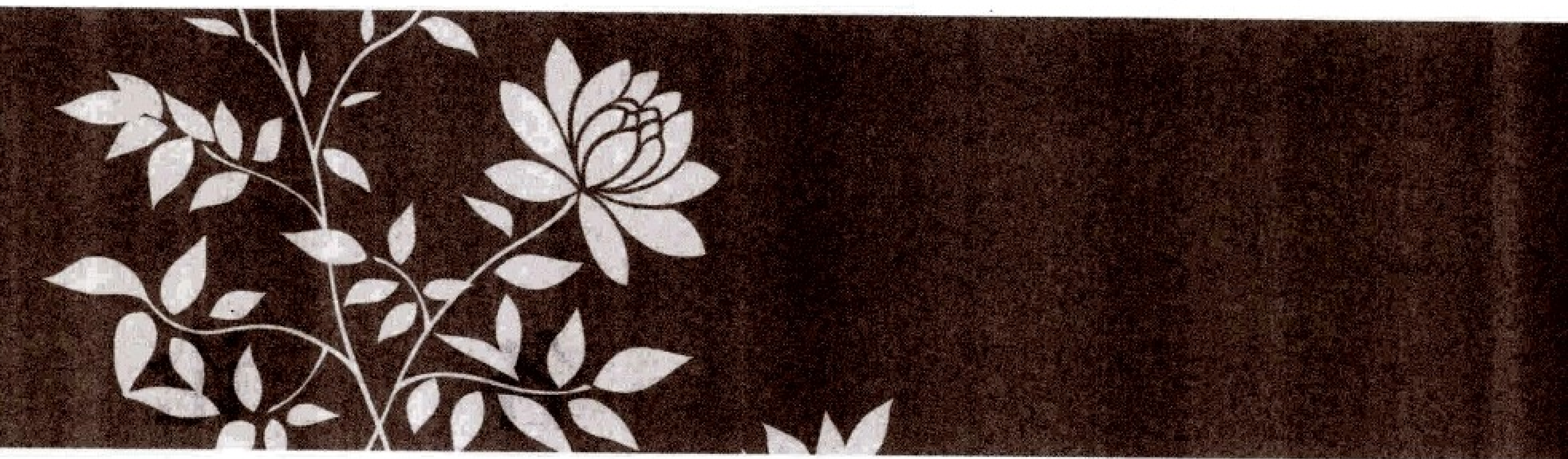
The application of digital technique in pictures extends the space of post-production of image unlimitedly. Good processing skills will enhance the quality of image. Adobe Photoshop is a very practical and effective software, by which pictures could be cropped, adjusted in size and equalized for the deficiency (including over-or inadequate exposure time, purge of noise in pictures, etc.), as well as the color adjustment, etc. Specific method of operation could be referred to books concerned.





各　论







丁　香

Dingxiang

FLOS CARYOPHYLLI

本品为桃金娘科植物丁香*Eugenia caryophyllata* Thunb. 的干燥花蕾。

[显微特征]　本品萼筒中部横切面：表皮细胞1列，有较厚角质层。皮层外侧散有2～3列径向延长的椭圆形油室，长150～200μm；其下有20～50个小型双韧维管束，断续排列成环，维管束外围有少数中柱鞘纤维，壁厚，木化。内侧为数列薄壁细胞组成的通气组织，有大型腔隙。中心轴柱薄壁组织间散有多数细小维管束，薄壁细胞含众多细小草酸钙簇晶。(图1～3)

Transverse section of the middle of calyx tube: Epidermal cells 1 layer, with relatively thick cuticle. Oil cavities arranged in 2 ~ 3 rows, longitudinally elongated elliptical, 150 ~ 200μm long, scattered in the outer part of cortex; 20 ~ 50 small bicollateral vascular bundles occurring underneath, arranged in interrupted rings and each bundle surrounded by a few pericyclic fibres, walls of fibres thickened and lignified. Aerenchyma consisting of several layers of parenchymatous cells, occurring in the inner part, with large intercellular space. Numerous small vascular bundles scattered in the stele parenchyma. Parenchymatous cells containing numerous minute clusters of calcium oxalate.　(Fig 1 ~ 3)

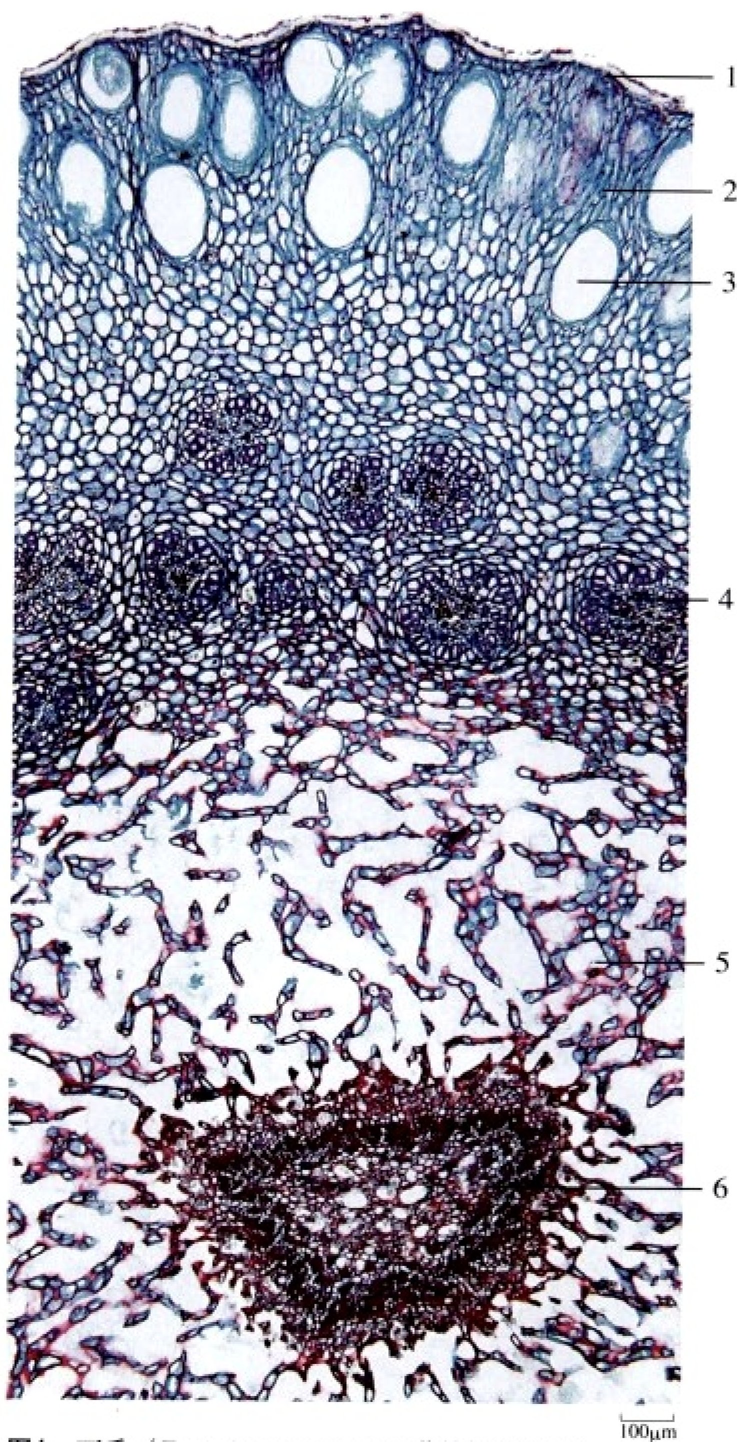


图1　丁香（*Eugenia caryophyllata* 萼筒）横切面

[Fig1　Transverse section of calyx tube from *Eugenia caryophyllata*]

1. 表皮（Epidermis）　2. 皮层（Cortex）　3. 油室（Oil cavities）
4. 双韧维管束（Bicollateral vascular bundles）　5. 通气组织（Aerenchyma）
6. 中心轴柱维管束（Stele vascular bundles）

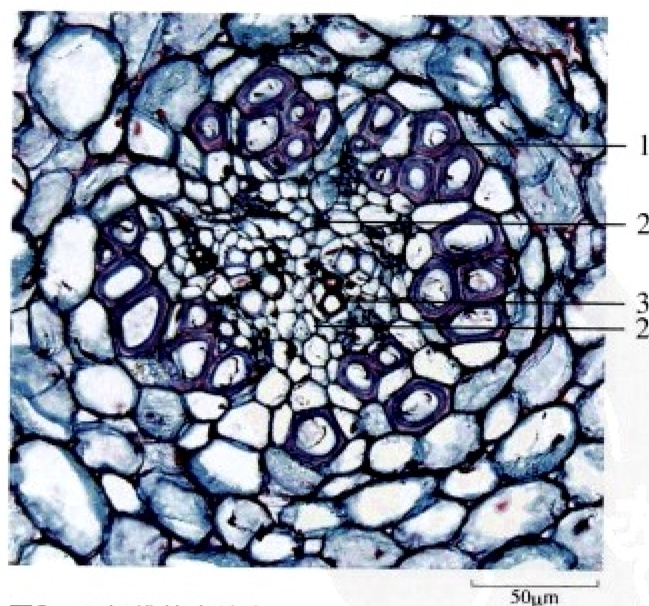


图2　双韧维管束放大

[Fig2　Bicollateral vascular bundle magnified]

1. 纤维（Fibres）　2. 韧皮部（Phloem）　3. 木质部（Xylem）

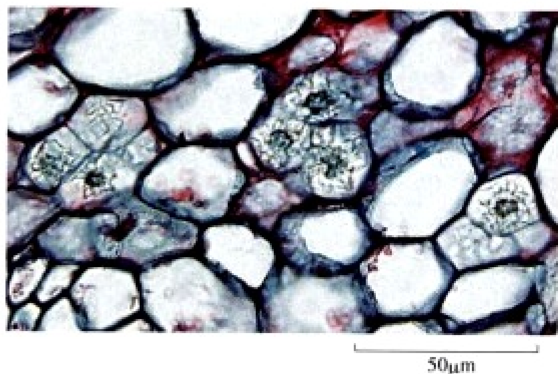


图3　示细小草酸钙簇晶

[Fig3　Showing fine clusters of calcium oxalate]

本品粉末：暗红棕色。纤维梭形，顶端钝圆，壁甚厚。花粉粒众多，极面观三角形，赤道面观双凸镜形，具3副合沟。草酸钙簇晶众多，直径4～26μm，存在于较小的薄壁细胞中。油室多破碎，分泌细胞界限不清，含黄色油状物。（图4）

Powder: Dark reddish-brown. Fibres spindle-shaped, apex obtused and walls strongly thickened. Pollen grains numerous, triangular in polar view and two convex lense shaped in equatorial view, with 3 furrows. Clusters of calcium oxalate numerous, 4～26 μm in diameter, occurring in relatively small parenchymatous cells. Oil cavities frequently broken, boundary of secretory cells indistinct, containing yellow oil. （Fig 4）



图4 丁香（*Eugenia caryophyllata* 花蕾）粉末

[Fig4 Powder of flower bud from *Eugenia caryophyllata*]

1. 纤维（Fibres） 2. 花粉粒（Pollen grains） 3. 草酸钙簇晶（Clusters of calcium oxalate） 4. 油室（Oil cavities）

八角茴香

Bajiaohuixiang

FRUCTUS ANISI STELLATI

本品为木兰科植物八角茴香 *Illicium verum* Hook. f. 的干燥成熟果实。

[显微特征]　**本品粉末：**红棕色。内果皮栅状细胞长柱形，长200～546μm，壁稍厚，纹孔口十字状或人字状。种皮石细胞黄色，表面观类多角形，壁极厚，波状弯曲，胞腔分枝状，内含棕黑色物；断面观长方形，壁不均匀增厚。果皮石细胞类长方形、长圆形或分枝状，壁厚。纤维长，单个散在或成束，直径29～60μm，壁木化，有纹孔。中果皮细胞红棕色，散有油细胞。内胚乳细胞多角形，含脂肪油滴和糊粉粒。（图1）

Powder: Reddish-brown. Palisade cells of endocarp column-shaped, 200 ~ 546 μm long, walls slightly thickened with cross or V-shaped pits. Stone cells of testa yellow, subpolygonal in surface view, walls strongly thickened, undulate, lumina branched, containing brownish-black contents; rectangular in lateral view with unevenly thickened walls. Stone cells of pericarp subrectangular, oblong or branched with thickened walls. Fibres long, scattered singly or in bundles, 29 ~ 60 μm in diameter, walls lignified and pitted. Cells of mesocarp reddish-brown, with oil cells scattered. Cells of endosperm polygonal, containing oil droplets and aleurone grains. (Fig 1)

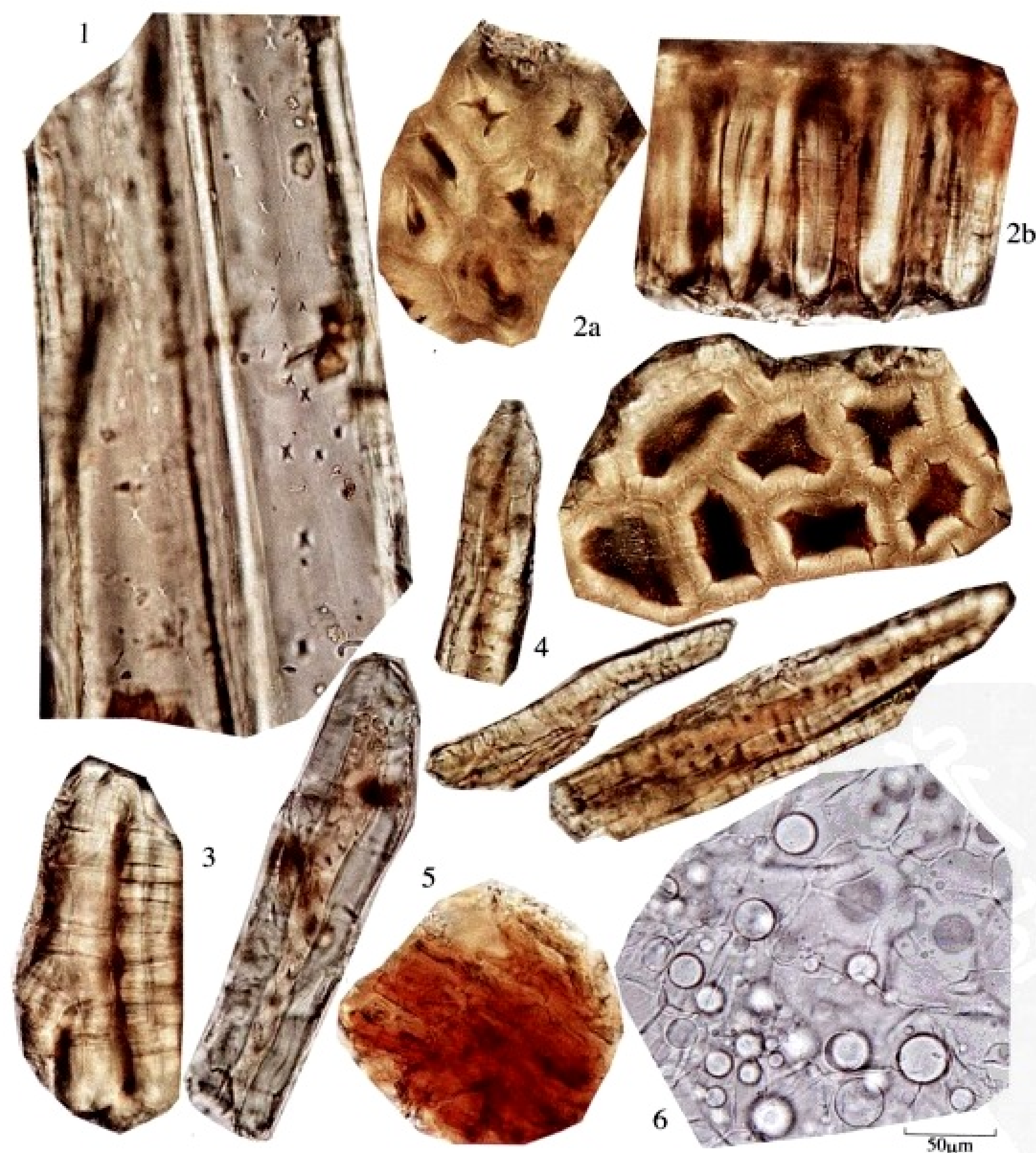


图1　八角茴香（*Illicium verum* 果实）粉末

[Fig1　Powder of fruit from *Illicium verum*]

1. 内果皮栅状细胞（Palisade cells of endocarp）　2. 种皮石细胞[Stone cells of testa（a.表面观surface view　b.断面观lateral view）]　3. 果皮石细胞（Stone cells of pericarp）　4. 纤维（Fibres）　5. 中果皮细胞（Mesocarp cells）　6. 内胚乳（Endosperm）

人　　参
Renshen
RADIX ET RHIZOMA GINSENG

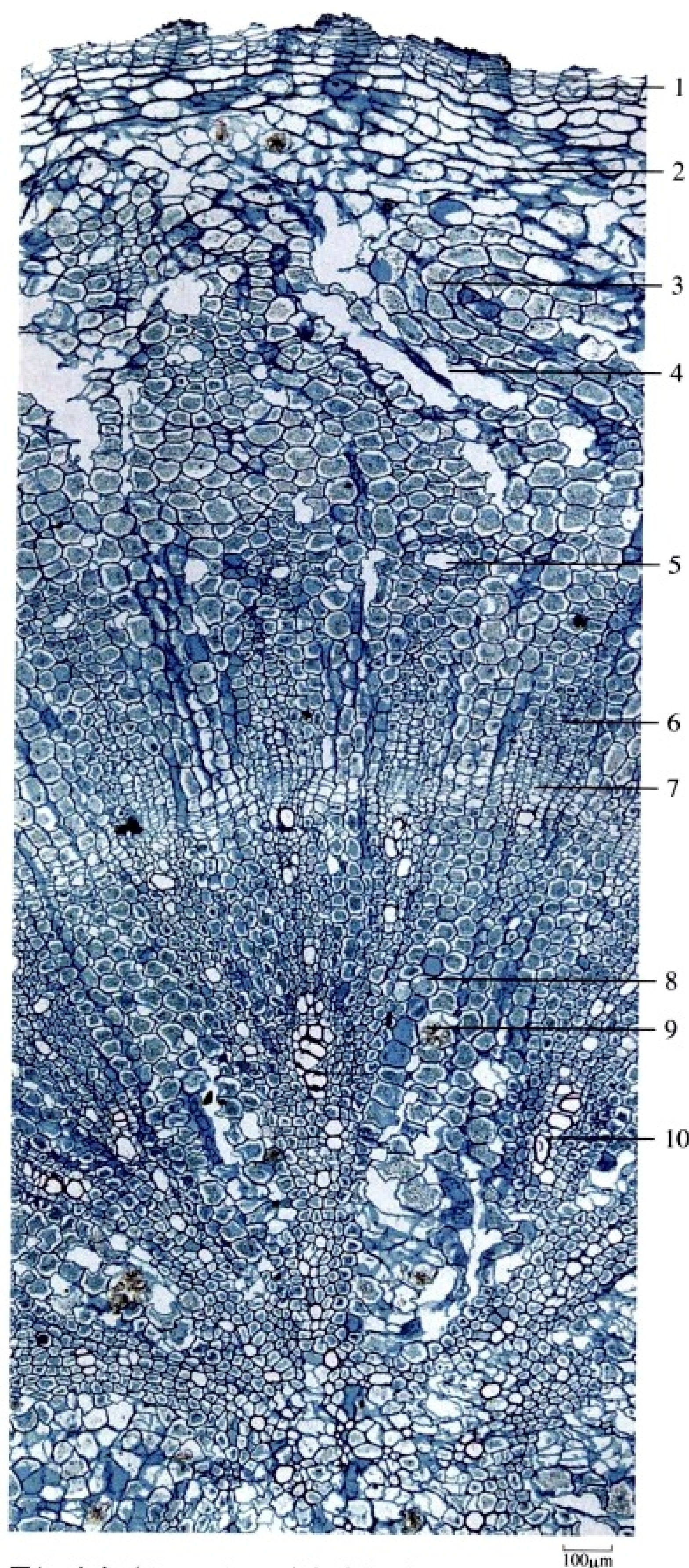


图1　人参（*Panax ginseng* 根）横切面
[Fig1　Transverse section of root from *Panax ginseng*]
1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮射线（Phloem ray）　4. 裂隙(Cleft)　5. 树脂道(Resin canals)　6. 韧皮部(Phloem)　7. 形成层（Cambium）　8. 木射线（Xylem rays）　9. 草酸钙簇晶（Clusters of calcium oxalate）　10. 木质部（Xylem）

本品为五加科植物人参*Panax ginseng* C. A. Mey. 的干燥根及根茎。

[显微特征]　**本品根横切面**：木栓层为数列细胞。栓内层窄。韧皮部外侧有裂隙，内侧薄壁细胞排列较紧密，有树脂道散在，内含黄色分泌物。形成层成环。木质部射线宽广，导管单个散在或数个相聚，断续排列成放射状，导管旁偶有非木化的纤维。薄壁细胞含草酸钙簇晶。（图1、2）

Transverse section: Cork consisting of several rows of cells. Phelloderm narrow. Phloem showing clefts in the outer part, parenchymatous cells in the inner part densely arranged and scattered with resin canals containing yellow secretions. Cambium in a ring. Xylem rays broad, vessels singly scattered or grouped, interruptedly arranged radially, occasionally accompanied by non-lignified fibres. Parenchymatous cells containing clusters of calcium oxalate.（Fig 1, 2）

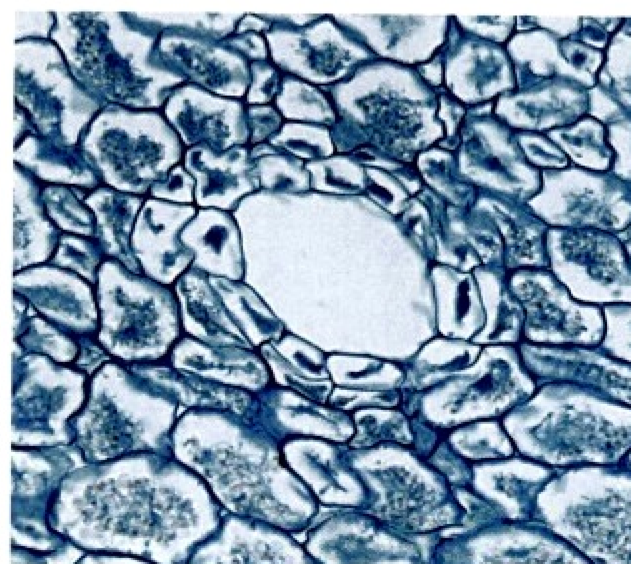


图2　示树脂道
[Fig2　Showing resin canals]

本品粉末：淡黄白色。树脂道碎片易见，含黄色块状分泌物。草酸钙簇晶直径20～68μm，棱角锐尖。木栓细胞表面观类方形或多角形，壁细波状弯曲。网纹导管及梯纹导管直径10～56μm。淀粉粒甚多，单粒类球形、半圆形或不规则多角形，直径4～20μm，脐点点状或裂缝状；复粒由2～6分粒组成。（图3）
Powder: Pale yellowish-white. Fragments of resin canals containing yellow masses of secretion. Clusters of calcium oxalate 20～68 μm in diameter, with acute angles. Cork cells subsquare or polygonal in surface view, with sinuous walls. Reticulated and scalariform vessels 10～56 μm in diameter. Starch granules abundant, simple granules subspheroidal, semicircular or irregular polygonal, 4～20 μm in diameter, hilum pointed or slit shaped; compound granules of 2～6 components.（Fig 3）



图3 人参（*Panax ginseng* 根）粉末
[Fig3 Powder of root from *Panax ginseng*]
1. 树脂道碎片（Fragments of resin canals） 2. 草酸钙簇晶（Clusters of calcium oxalate） 3. 木栓细胞（Cork cells） 4. 导管（Vessels） 5. 淀粉粒（Starch granules）

人 参 叶

Renshenye

FOLIUM GINSENG

本品为五加科植物人参*Panax ginseng* C. A. Mey. 的干燥叶。

[显微特征] **本品粉末**：黄绿色。上表皮细胞形状不规则，略呈长方形，长35～92μm，宽32～60μm，垂周壁波状或深波状。下表皮细胞与上表皮相似，略小；气孔不定式，保卫细胞长31～35μm。叶肉无栅栏组织，多由4层类圆形薄壁细胞组成，直径18～29μm，含叶绿体或草酸钙簇晶；草酸钙簇晶直径12～40μm，棱角锐尖。（图1）

Powder: Yellowish-green. Upper epidermal cells irregular, nearly rectangular, 35～92 μm long, 32～60 μm wide, with sinuous or deep sinuous anticlinal walls. Lower epidermal cells similar to upper epidermal cells, relatively small, stomata anomocytic, guard cells 31～35 μm long. Palisade tissue absent, mesophyll consisting of 4 layers of subrounded parenchymatous cells of 18～29 μm in diameter, containing chloroplasts or clusters of calcium oxalate，12～40 μm in diameter, acutangular. （Fig 1）



图1 人参叶（*Panax ginseng* 叶）粉末

[Fig1 Powder of leaf from *Panax ginseng*]

1. 上表皮细胞（Upper epidermal cells） 2. 下表皮细胞（Lower epidermal cells） 3. 叶肉细胞（Mesophyll cells） 4. 草酸钙簇晶（Clusters of calcium oxalate）

九　里　香

Jiulixiang

FOLIUM ET CACUMEN MURRAYAE

本品为芸香科植物九里香*Murraya exotica* L.和千里香*Murraya paniculata*（L.）Jack的干燥叶和带叶嫩枝。

[显微特征]　**本品叶的横切面**：上、下表皮细胞各1列，长方形，其上可见单细胞非腺毛，长30～70（100）μm,直径9～15μm；叶肉组织不等面型，栅栏组织2～3列，不通过主脉；主脉维管束双韧型，其上、下两侧有纤维群，木化；叶肉组织含众多草酸钙簇晶，直径9～25μm，有时可见方晶；油室多数，圆形，直径80～120μm，内含黄色油滴。(图1、2)

Transverse section of leaf: Upper and lower epidermis 1 layer of cells respectively, cells rectangular, bearing unicellular non-glandular hairs of 30～70 （100） μm long, and 9～15 μm in diameter. Mesophyll tissue bifacial, palisade 2～3 layers of cells, not reaching the midrib. Vascular bundle of midrib bicollateral, lignified fibres occurring above and under the vascular bundle; mesophyll tissue containing numerous clusters of calcium oxalate, 9～25 μm in diameter, sometimes prisms visible; oil cavities numerous, rounded, 80～120 μm in diameter, containing yellow oil droplets. （Fig 1，2）

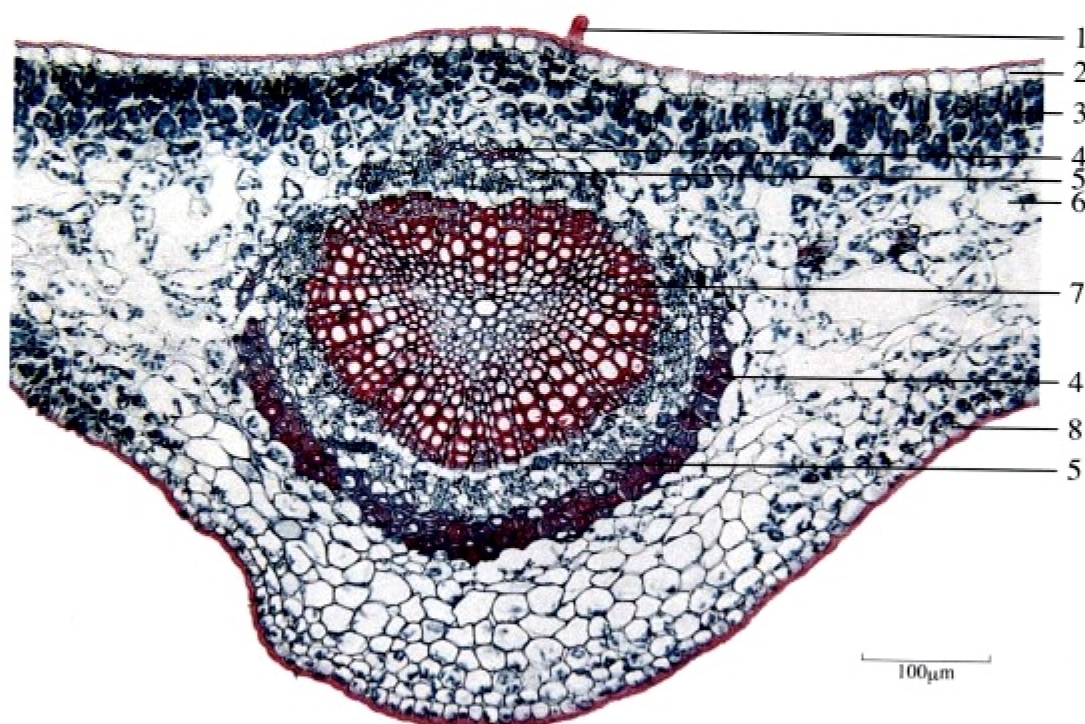


图1　九里香（*Murraya exotica* 叶）横切面

[Fig1　Transverse section of leaf from *Murraya exotica*]

1. 非腺毛（Non-glandular hairs）　2. 上表皮（Upper epidermis）　3. 栅栏组织（Palisade tissue）　4. 纤维（Fibres）　5. 韧皮部（Phloem）　6. 叶肉组织（油室）[Mesophyll tissue (Oil cavities)]　7. 木质部（Xylem）　8. 下表皮（Lower epidermis）

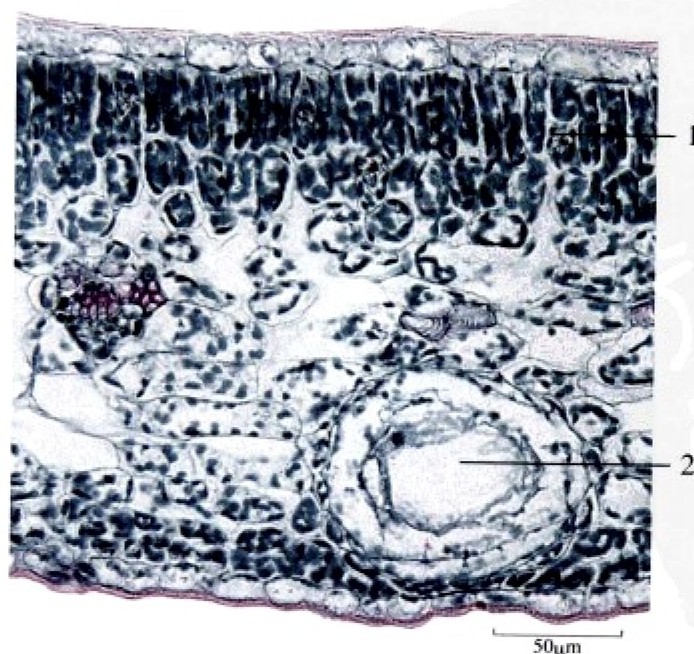


图2　叶片部分放大

[Fig2　Blade partially magnified]

1. 草酸钙簇晶（Clusters of calcium oxalate）
2. 油室（Oil cavity）

刀　豆
Daodou
SEMEN CANAVALIAE

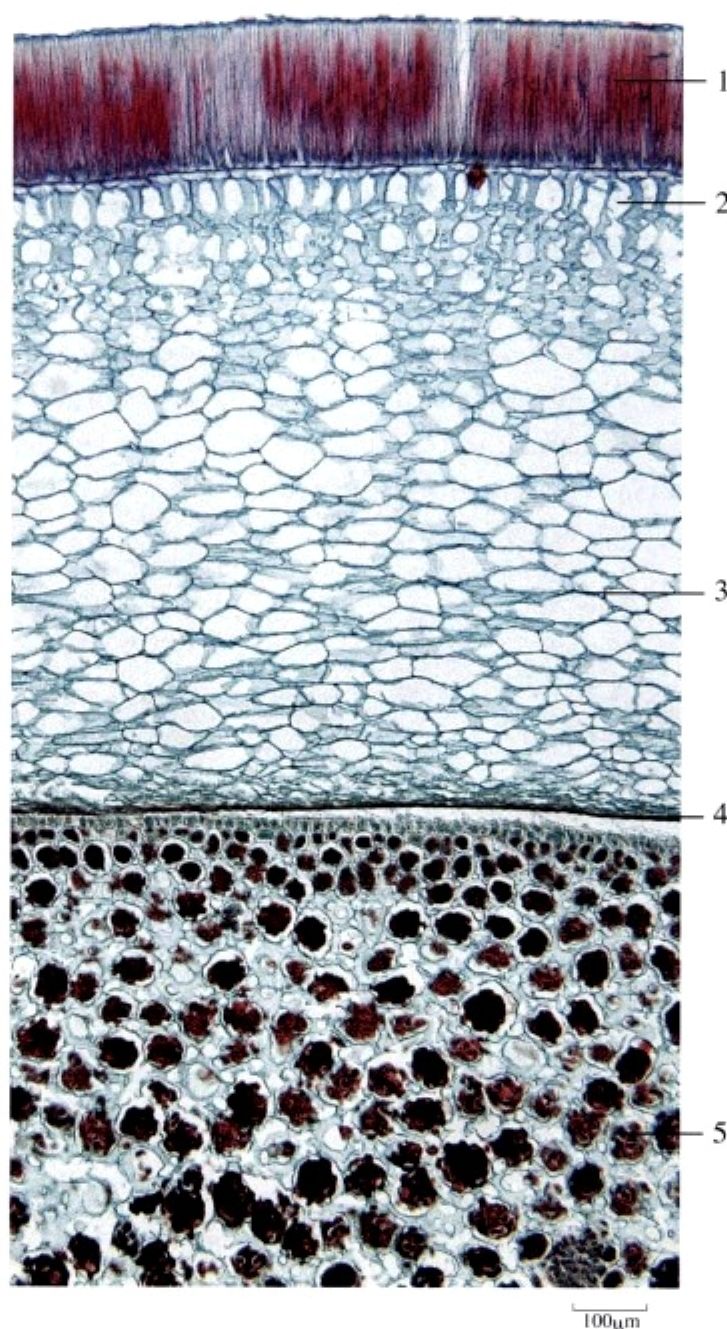


图1　刀豆（*Canavalia gladiata* 种子）横切面

[Fig1　Transverse section of seed from *Canavalia gladiata*]

1. 种皮表皮栅状细胞（Palisade cells of epidermis）　2. 支持细胞（Supporting cells）　3. 薄壁细胞（Parenchymatous cells）　4. 胚乳细胞（Endosperm cells）　5. 子叶细胞（Cells of cotyledons）

本品为豆科植物刀豆*Canavalia gladiata* (Jacq.) DC. 的干燥成熟种子。

[显微特征]　**本品横切面**：种皮表皮为1列栅状细胞，种脐处2列，外被角质层，光辉带明显。支持细胞2～6列，呈哑铃状。营养层由十多列切向延长的薄壁细胞组成，内侧细胞呈颓废状；有维管束。种皮下方为数列多角形胚乳细胞。子叶细胞含众多淀粉粒。管胞岛椭圆形，壁网状增厚，具缘纹孔少见；周围有4～5层薄壁细胞，其两侧为星状组织，细胞呈星芒状，有大型的细胞间隙。（图1～3）

Transverse section: Epidermis of testa consisting of 1 layer of palisade cells, 2 layers at hilum, covered with cuticle layer outside, a light band distinct. Supporting cells 2 ~ 6 layers, dumbbell-shaped. Nutritive layer consisting of more than 10 layers of parenchymatous cells, tangentially elongated, the inner ones obliterate; vascular bundles visible. Several layers of polygonal cells of endosperm located under testa. Cotyledon cells containing numerous starch granules. Tracheid islet elliptical, walls reticularly thickened, bordered pits few, surrounded by 4～5 layers of parenchymatous cells, with stellate tissue at two sides, cells stellate, with large intercellular space. （Fig 1～3）

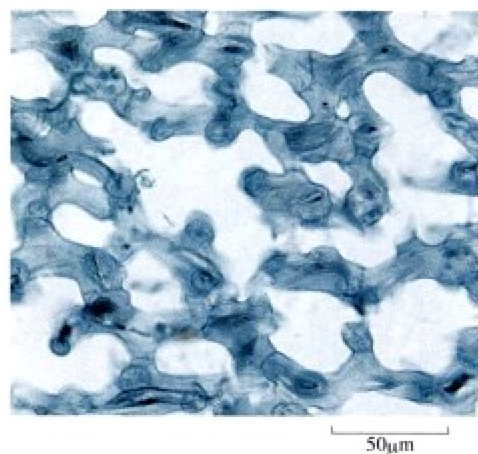


图3　示星状组织

[Fig3　Showing stellate tissue]

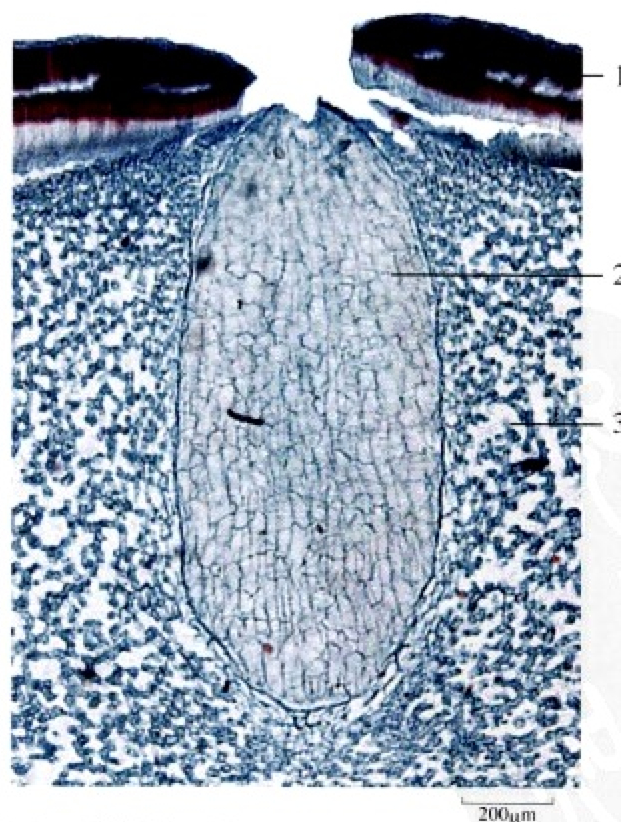


图2　种脐部位放大

[Fig2　Hilum magnified]

1. 表皮栅状细胞（Palisade cells of epidermis）　2. 管胞岛（Tracheid islet）　3. 星状组织（Stellate tissue）

三　七

Sanqi

RADIX ET RHIZOMA NOTOGINGSENG

本品为五加科植物三七*Panax notoginseng*（Burk.） F. H. Chen的干燥根及根茎。

[显微特征]　本品粉末：灰黄色。淀粉粒甚多，单粒类圆形、半圆形或圆多角形，直径4～30 μm；复粒由2～10余分粒组成。树脂道碎片含黄色分泌物。梯纹导管、网纹导管及螺纹导管直径15～55μm。草酸钙簇晶少见，直径50～80μm。（图1）

Powder: Greyish-yellow. Starch granules fairly abundant, simple granules spherical, semispherical or round-polygonal, 4～30 μm in diameter; compound granules of 2～10 or more components. Fragments of resin canals containing yellow secretion. Scalariform, reticulated and spiral vessels 15～55 μm in diameter. Clusters of calcium oxalate infrequent, 50～80 μm in diameter. (Fig 1)



图1　三七（*Panax notoginseng* 根）粉末

[Fig1　Powder of root from *Panax notoginseng*]

1. 淀粉粒（Starch granules）　2. 树脂道（Resin canals）　3. 导管（Vessels）　4. 草酸钙簇晶（Clusters of calcium oxalate）

三 白 草

Sanbaicao

HERBA SAURURI

本品为三白草科植物三白草*Saururus chinensis*（Lour.）Baill. 的干燥地上部分。

［显微特征］　本品叶表面观 上下表皮细胞略呈多角形，角质层纹理明显，表皮中有油细胞散在，圆形，直径32～44μm，内含黄色油滴。上表皮无气孔。下表皮气孔多，不定式，有腺毛，2～3细胞，长40～70μm，基部直径12～16μm。（图1）

Surface view of leaf: The cells of upper and lower epidermis somewhat polygonal, cuticulate striations distinct, oil cells scattered in epidermis, rounded, 32～44 μm in diameter, and containing yellow oil drops. Stomata absent in upper epidermis, but numerous in lower epidermis, anomocytic, with glandular hairs, the hairs 2～3 celled, 40～70 μm long, and 12～16 μm in diameter at base. (Fig 1)

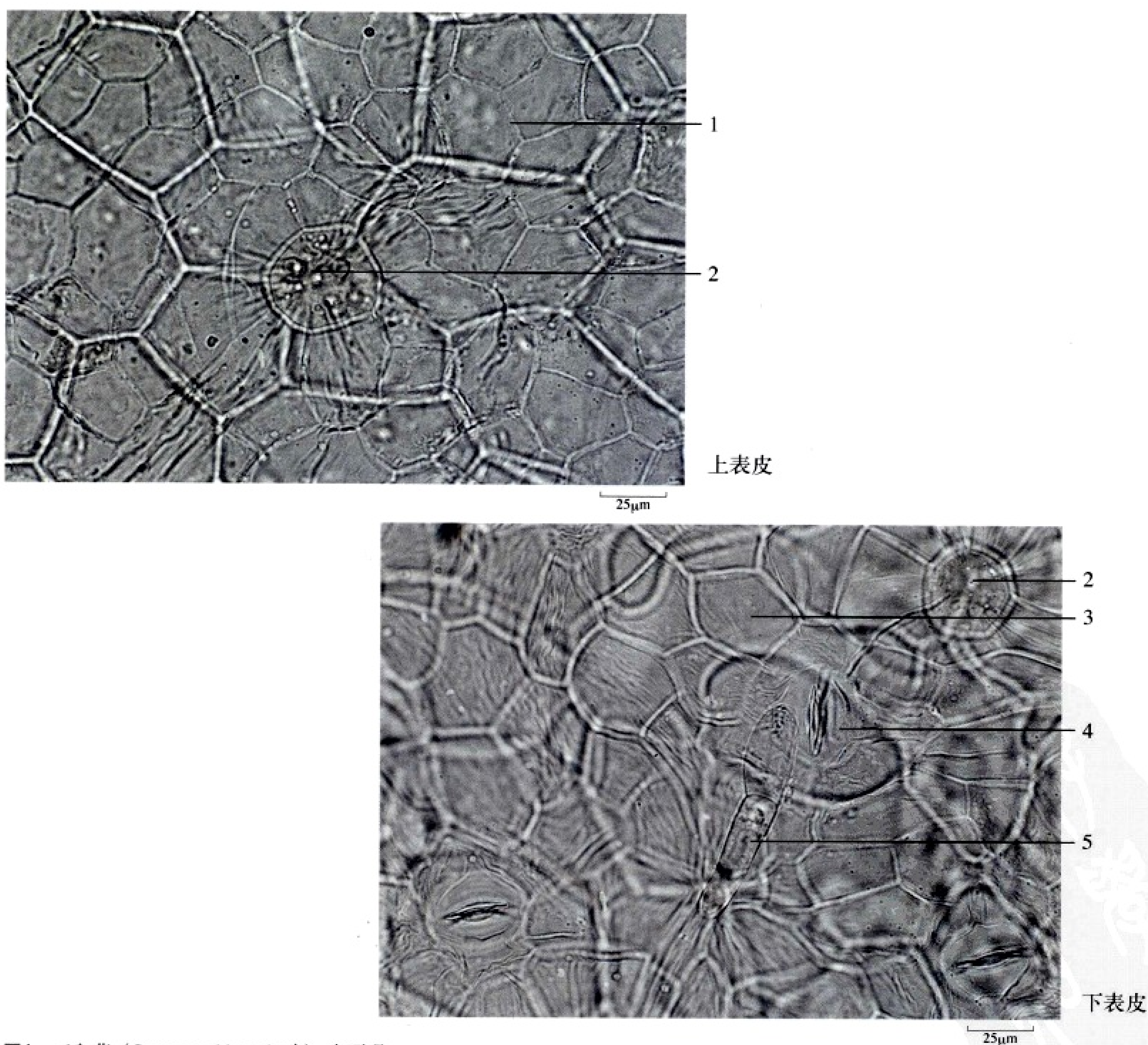


图1　三白草（*Saururus chinensis* 叶）表面观

[Fig1　Surface view of leaf from *Saururus chinensis*]

1. 上表皮细胞（Upper epidermal cells）　2. 油细胞（Oil cells）　3. 下表皮细胞（Lower epidermal cells）　4. 气孔（Stomata）　5. 腺毛（Glandular hair）

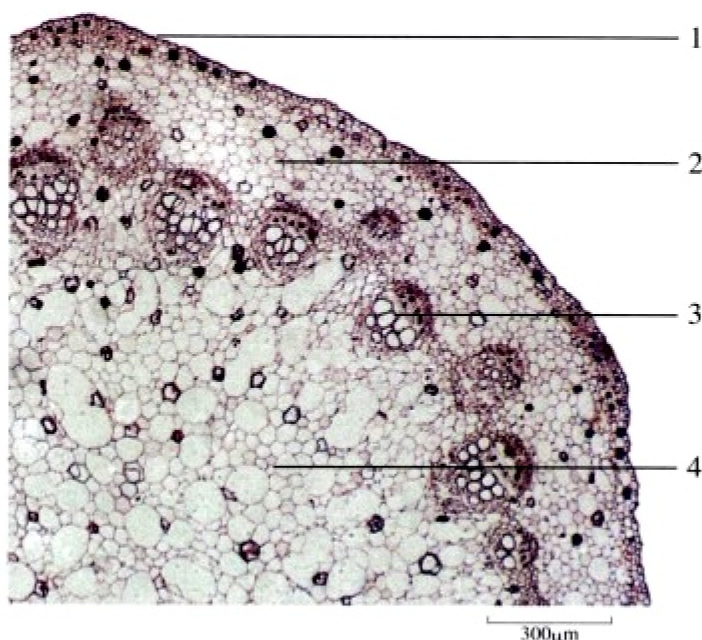
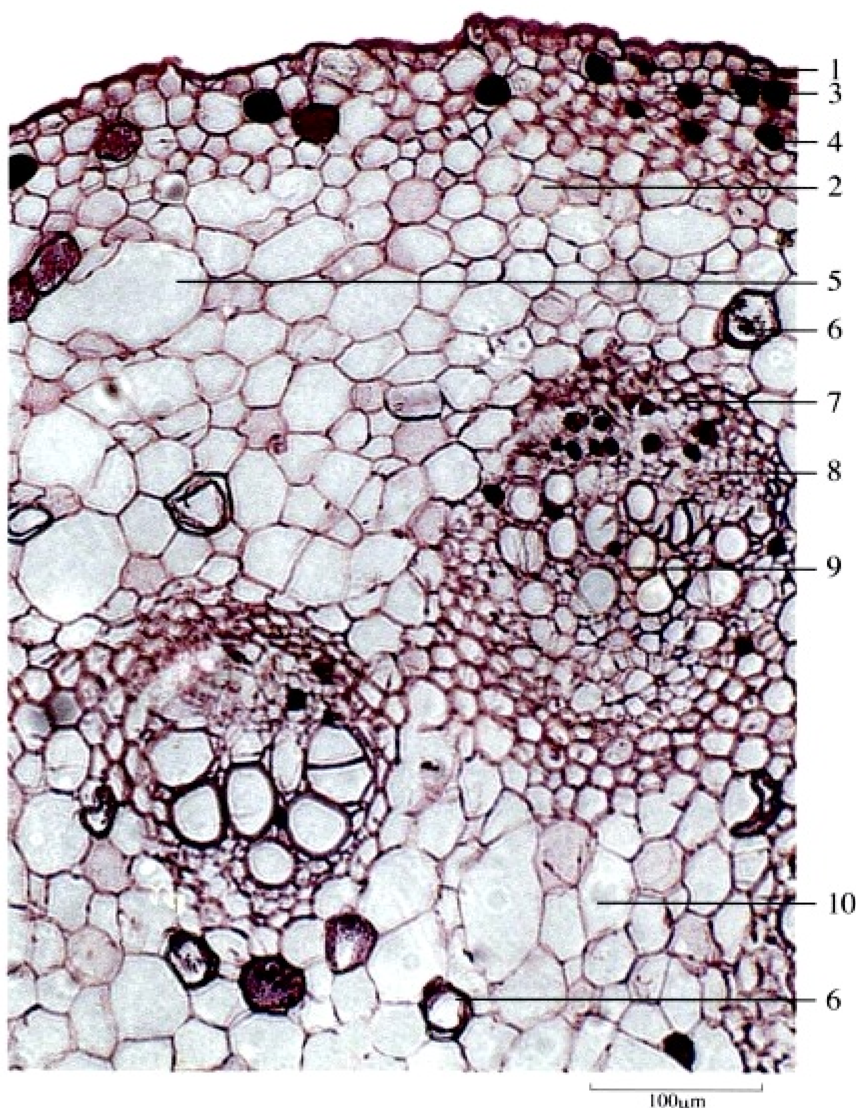


图2 三白草（*Saururus chinensis* 茎）横切面
[Fig2 Transverse section of stem from *Saururus chinensis*]
1. 表皮细胞(Epidermal cells) 2. 皮层(Cortex) 3. 维管束(Vascular bundles) 4. 髓部(Pith)



本品茎横切面：表皮细胞类方形，下皮厚角细胞在棱线处较多。皮层可见通气组织，由类圆形薄壁细胞构成，排列成网状，有大型腔隙；有油细胞和分泌管散在，油细胞内含黄色油滴，分泌管内含淡棕色物质。中柱鞘纤维3～4列断续排列成环。维管束外韧型。髓部宽广，亦可见通气组织；有油细胞散在。薄壁细胞大多含草酸钙簇晶，直径12～25μm。(图2、3)

Transverse section of stem: Epidermal cells subsquare. Collenchymatous cells of hypodermis mainly occurring under the ridges. Aerenchyma visible in cortex, consisting of subrounded parenchymatous cells, reticulately arranged, with large intercellular space, cortex scattered with oil cells and secretory ducts, oil cells containing oil drops, secretory ducts containing pale brown contents. Pericycle fibres 3～4 rows, interruptedly arranged in rings.Vascular bundles collateral. Pith broad, aerenchyma visible; oil cells scattered. Clusters of calcium oxalate frequently occurring in parenchymatous cells, 12 ～ 25 μm in diameter. (Fig 2, 3)

图3 局部组织放大
[Fig3 Partial tissue magnified]
1. 表皮细胞 (Epidermal cells) 2. 皮层 (Cortex) 3. 下皮厚角细胞 (Collenchymatous cells) 4. 分泌细胞 (Secretory cells) 5. 大型腔隙 (Large intercellular space) 6. 油细胞 (Oil cells) 7. 中柱鞘纤维(Pericycle fibres) 8. 韧皮部(Phloem) 9. 木质部(Xylem) 10. 髓部 (Pith)

三　　棱

Sanleng

RHIZOMA SPARGANII

本品为黑三棱科植物黑三棱*Sparganium stoloniferum* Buch.-Ham. 的干燥块茎。

［显微特征］　**本品横切面**：皮层为通气组织，薄壁细胞不规则形细胞间有大的腔隙；内皮层细胞排列紧密。中柱薄壁细胞类圆形，壁略厚，内含淀粉粒；维管束外韧型及周木型，散在，导管非木化。皮层及中柱均散有分泌细胞，内含棕红色分泌物。（图1、2）

Transverse section: Aerenchyma of cortex consisting of irregular parenchymatous cells, forming large intercellular spaces; endodermal cells densely arranged. Parenchymatous cells of stele subrounded, slightly thick-walled, containing starch granules; collateral and amphivasal bundles scattered, vessels non-lignified. Secretory cells scattered in cortex and stele filled with brownish-red secretion. (Fig 1, 2)

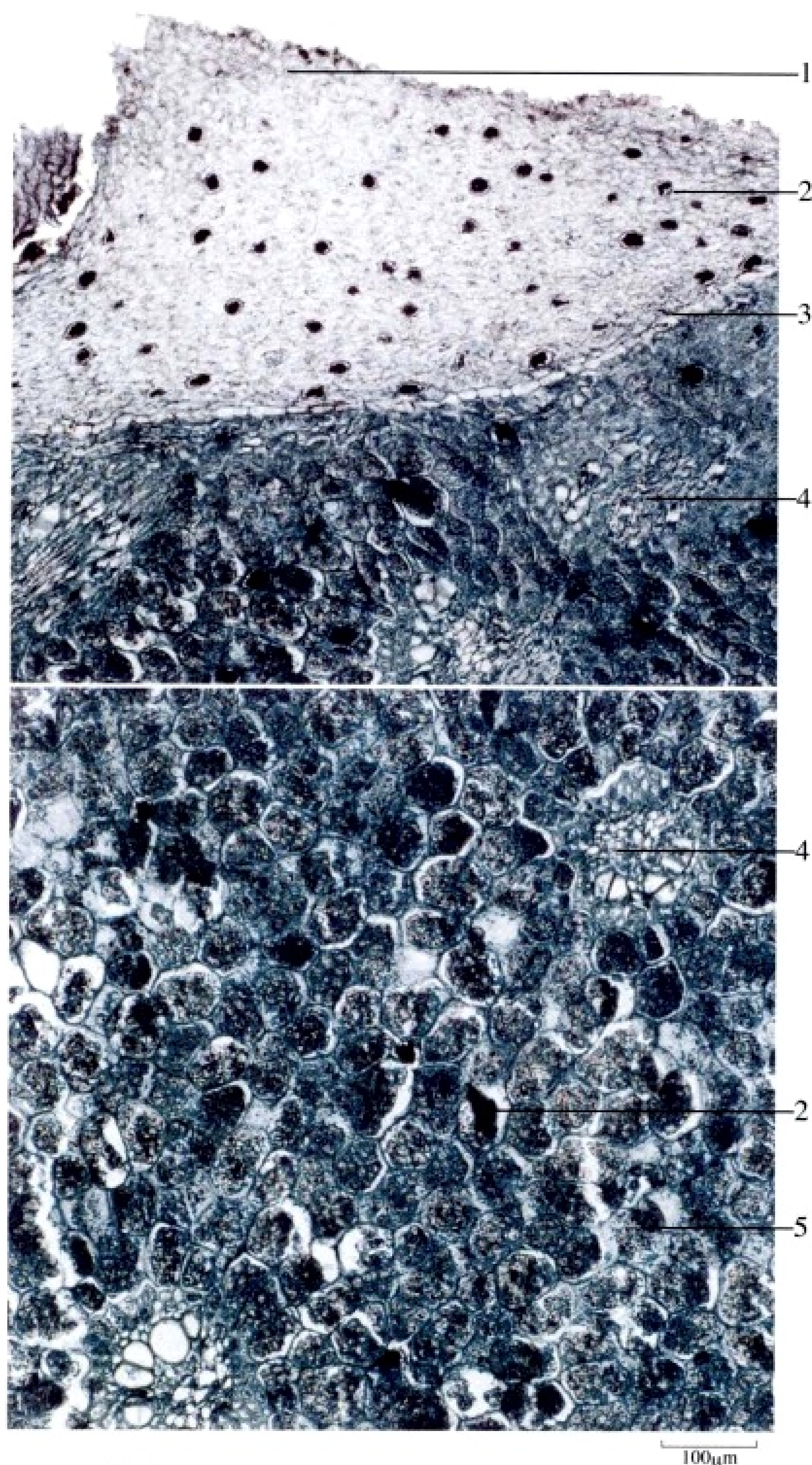


图1　三棱（*Sparganium stoloniferum* 块茎）横切面

[Fig1　Transverse section of tuber rhizome from *Sparganium stoloniferum*]

1. 皮层（Cortex）　2. 分泌细胞（Secretory cells）　3. 内皮层（Endodermis）
4. 维管束（Vascular bundle）　5. 淀粉粒（Starch granules）

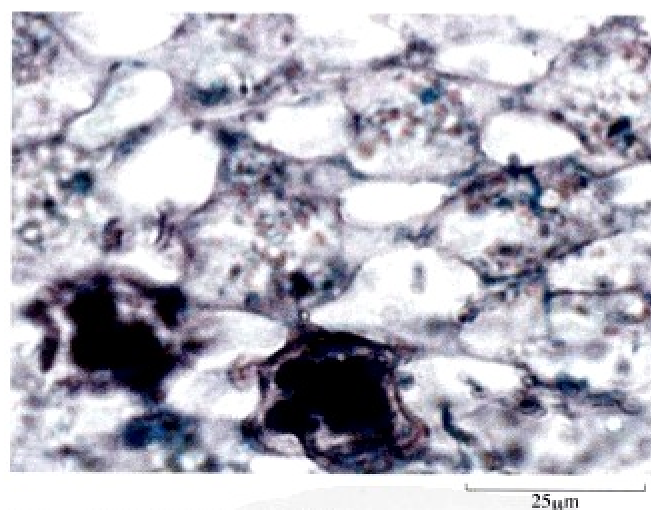


图2　示通气组织与分泌细胞

[Fig2　Showing aerenchyma in cortex]

干　　姜

Ganjiang

RHIZOMA ZINGIBERIS

本品为姜科植物姜*Zingiber officinale* Rosc. 的干燥根茎。

[显微特征]　**本品粉末**：淡黄棕色。淀粉粒众多，长卵圆形、三角状卵形、椭圆形、类圆形或不规则形，直径5～40μm，脐点点状，位于较小端，也有呈裂缝状者，层纹有的明显。油细胞及树脂细胞散于薄壁组织中，内含淡黄色油滴或暗红棕色物质。纤维成束或散离，先端钝尖，少数分叉，有的一边呈波状或锯齿状，直径15～40μm，壁稍厚，非木化，具斜细纹孔，常可见菲薄的横隔。梯纹导管、螺纹导管及网纹导管多见，少数为环纹导管，直径15～70μm。导管或纤维旁有时可见内含暗红棕色物的管状细胞，直径12～20μm。(图1)

Powder: Pale yellowish-brown. Starch granules fairly abundant, long ovate, triangular ovoid, elliptical, subrounded or irregular, 5～40 μm in diameter, hilum pointed, located at the small end, sometimes cleft, and some with obvious striations. Oil cells and resin cells scattered in parenchyma, containing pale yellow oil drops or dark reddish-brown substance. Fibres in bundles or scattered, apex obtused, few branched, some undulate or serrate on one side, 15～40 μm in diameter, walls slightly thickened, unlignified, with fine oblique pits, frequently with thin septa. Vessels mostly scalariform, spiral and reticulate, few annular, 15～70 μm in diameter. Tubular cells containing dark reddish-brown substance, 12～20 μm in diameter, occasionally found beside vessels and fibres.（Fig 1）

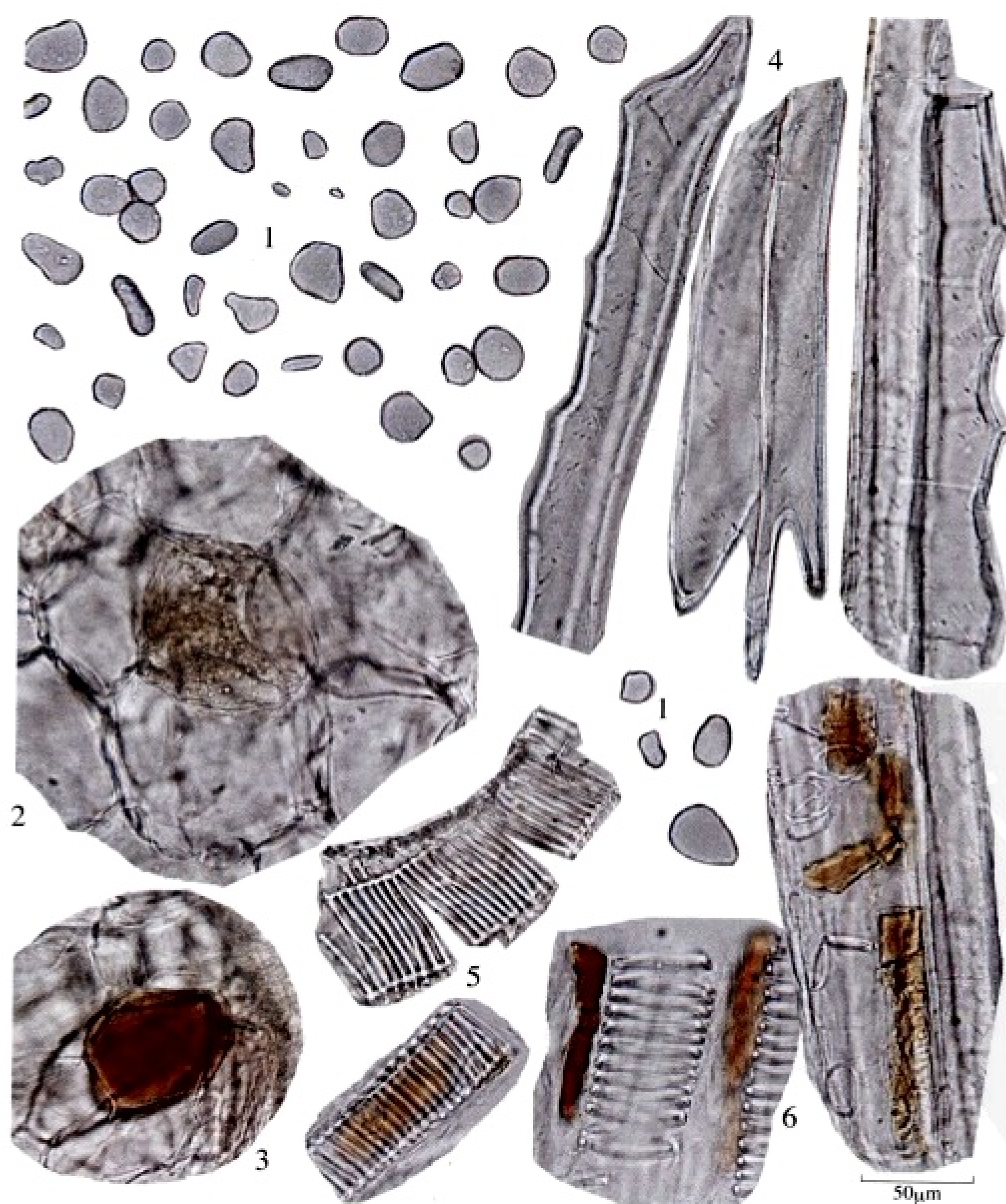


图1　干姜（*Zingiber officinale* 根茎）粉末

[Fig1　Powder of rhizome from *Zingiber officinale*]

1. 淀粉粒（Starch granules）　2. 油细胞（Oil cells）　3. 树脂细胞（Resin cells）　4. 纤维（Fibres）
5. 导管（Vessels）　6. 管状细胞（Tubular cells）

炮　　姜

Paojiang

RHIZOMA ZINGIBERIS PRAEPARATUM

本品为干姜的炮制加工品。

[显微特征]　**本品粉末**：棕褐色。淀粉粒众多，长卵圆形、三角状卵形、椭圆形、类圆形或不规则形，直径5～40μm，脐点点状，位于较小端，也有呈裂缝状者，层纹有的明显。偶见糊化淀粉粒团块。油细胞及树脂细胞散于薄壁组织中，内含淡黄色油滴或暗红棕色物质。纤维成束或散离，先端钝尖，少数分叉，有的一边呈波状或锯齿状，直径15～40μm，壁稍厚，非木化，具斜细纹孔，常可见菲薄的横隔。梯纹导管、螺纹导管及网纹导管多见，少数为环纹导管，直径15～70μm。导管或纤维旁有时可见内含暗红棕色物的管状细胞，直径12～20μm。（图1）

Powder: Brown. Starch granules abundant, long-ovoid, deltoid-ovoid, ellipsoid, subrounded or irregular, 5 ~ 40μm in diameter, hilum pointed in the smaller end and cleft-like as well, sometimes striations visible. Gelatinized masses of starch granules visible occasionally. Oil cells and resin cells scattered in parenchyma, containing pale yellow oil drops or dark reddish-brown contents. Fibres in bundles or scattered, blunt-acute at the end, few branched, sometimes sinuated on one side, 15 ~ 40 μm in diameter, walls thickened slightly, nonlignified, with fine oblique pits, and thin transverse septa usually visible. Vessels mostly scalariform, reticulate or spiral, occasionally annular, 15 ~ 70 μm in diameter. Tubular cells sometimes visible beside vessels or fibres, containing dark reddish- brown contents, 12～20 μm in diameter.（Fig 1）

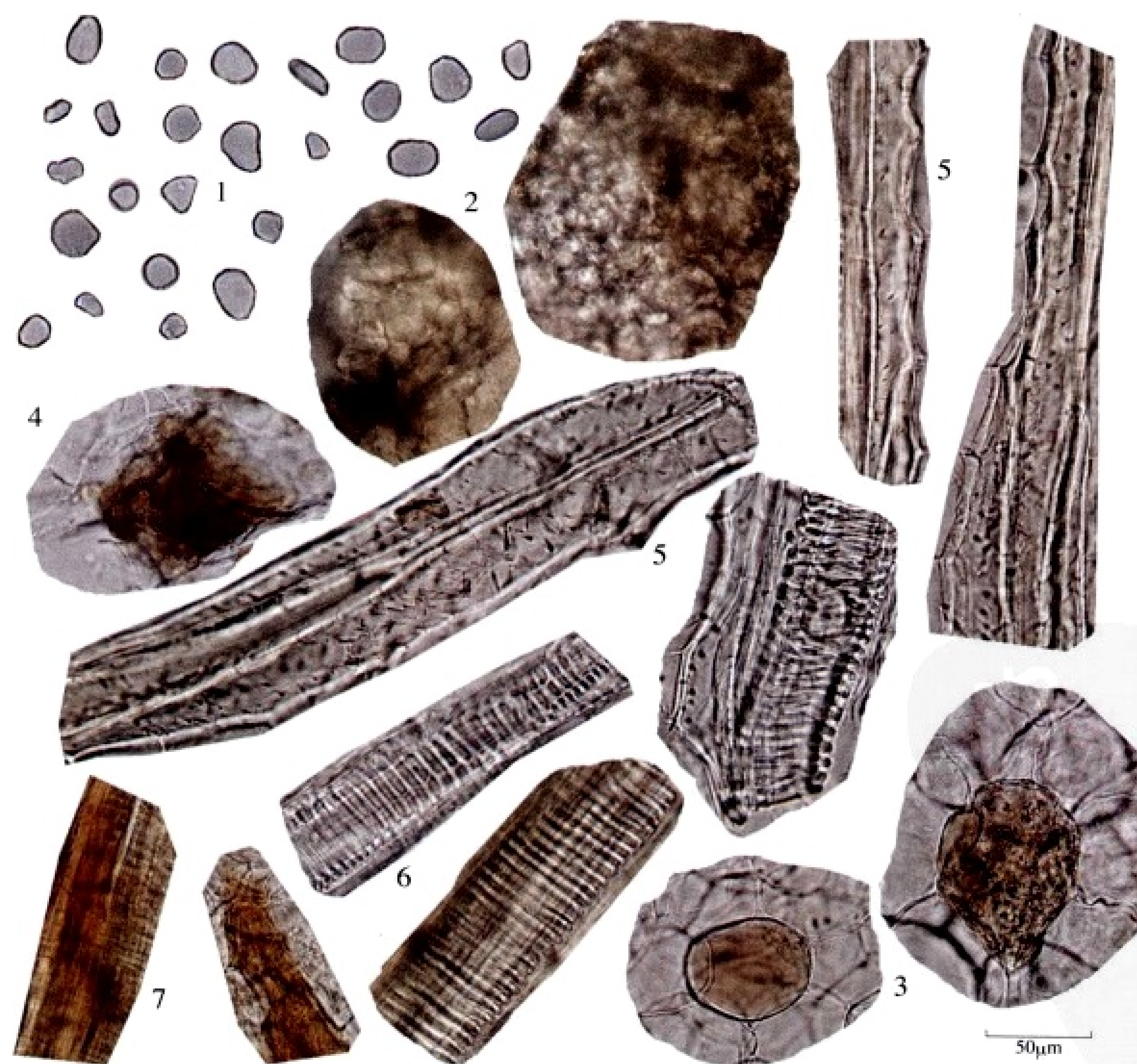


图1　炮姜（*Zingiber officinale* 根茎炮制加工品）粉末

[Fig1　Powder of prepared rhizome from *Zingiber officinale*]

1. 淀粉粒（Starch granules）　2. 糊化淀粉粒团块（Gelatinized masses of starch granules）　3. 油细胞（Oil cells）　4. 树脂细胞（Resin cells）　5. 纤维（Fibres）　6. 导管（Vessels）　7. 管状细胞（Tubular cells）

土　木　香

Tumuxiang

RADIX INULAE

本品为菊科植物土木香*Inula helenium* L. 的干燥根。

[显微特征]　**本品横切面**：木栓层为数列木栓细胞。韧皮部宽广。形成层环不甚明显。木质部射线宽6～25列细胞；导管少，单个或数个成群，径向排列；木纤维少数，成束存在于木质部中心的导管周围。薄壁细胞含菊糖。油室分布于韧皮部与木质部，直径80～300μm。（图1、2）

Transverse section: Cork consisting of several layers of cells. Phloem broad. Cambium ring less distinct. Xylem rays 6 ~ 25 cells wide; vessels sparse, singly scattered or in groups, radiately arranged; xylary fibres rare, in bundles, surrounding the vessels at the centre of xylem. Parenchymatous cells containing inulin. Oil cavities scattered in phloem and xylem, 80 ~ 300 μm in diameter. (Fig 1, 2)

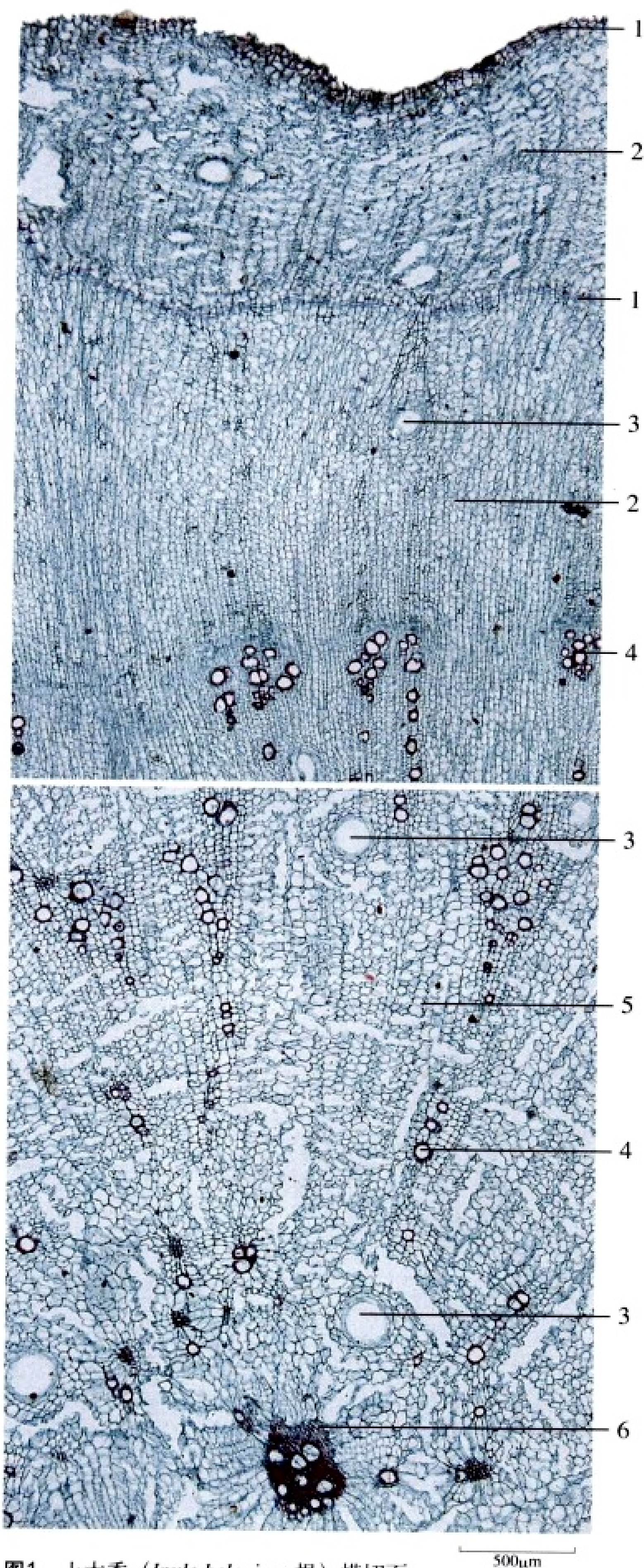


图1　土木香（*Inula helenium* 根）横切面

[Fig1　Transverse section of root from *Inula helenium*]

1. 木栓层（Cork）　2. 韧皮部（Phloem）　3. 油室（Oil cavities）
4. 木质部（Xylem）　5. 木射线（Xylem rays）　6. 木纤维（Xylem fibres）

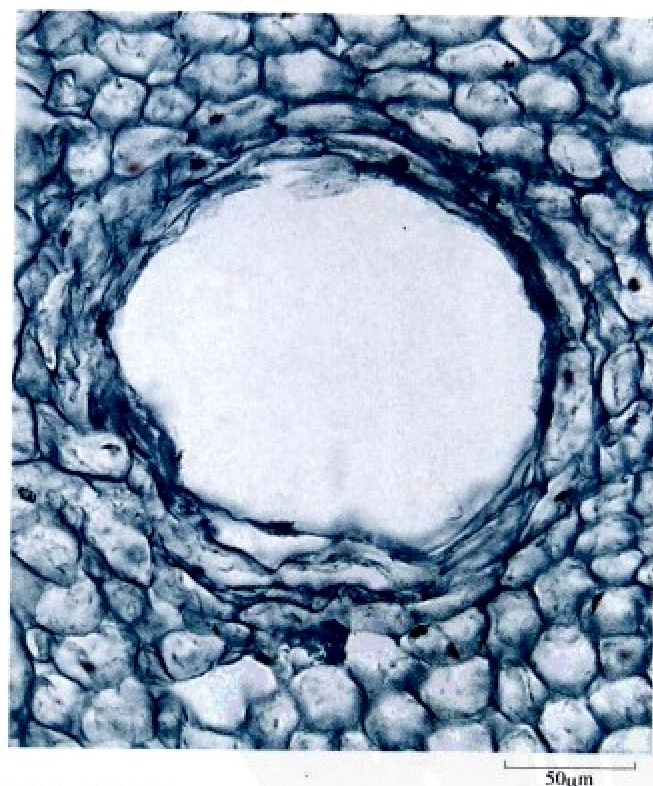


图2　示油室

[Fig2　Showing oil cavity]

本品粉末：淡黄棕色。菊糖众多，无色，呈不规则碎块状。网纹导管直径30～100μm。木栓细胞多角形，黄棕色。木纤维长梭形，末端倾斜，具斜纹孔。(图3)

Powder: Pale yellowish-brown. Inulin abundant, colourless, in irregular pieces. Reticulated vessels 30 ~ 100 μm in diameter. Cork cells polygonal, yellowish-brown. Xylary fibres long fusiform, with oblique ends and oblique pits. (Fig 3)

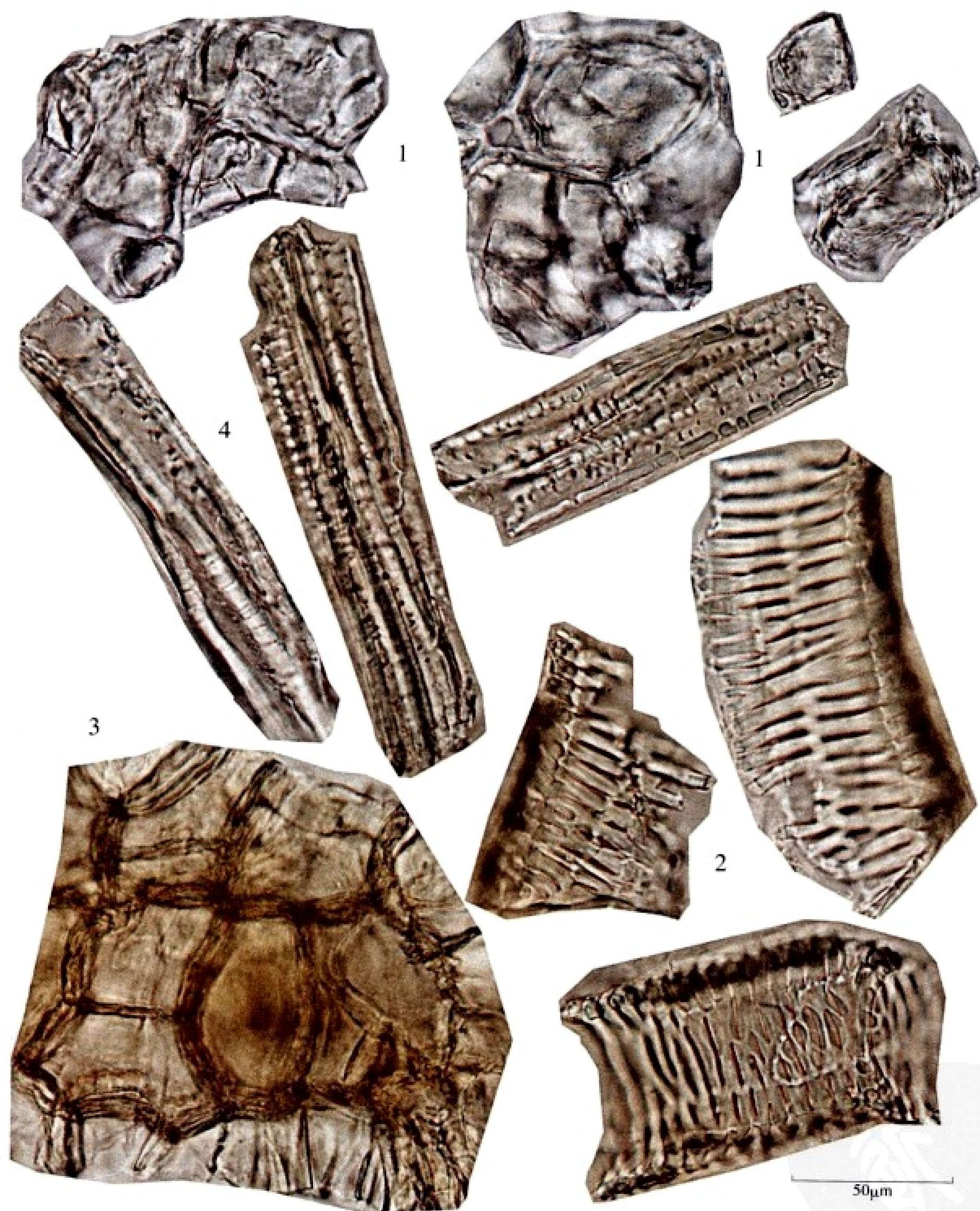


图3 土木香（*Inula helenium* 根）粉末

[Fig3 Powder of root from *Inula helenium*]

1. 菊糖（Inulin） 2. 导管（Vessels） 3. 木栓细胞（Cork cells） 4. 木纤维（Xylem fibres）

土 荆 皮

Tujingpi

CORTEX PSEUDOLARICIS

本品为松科植物金钱松*Pseudolarix kaempferi* Gord. 的干燥根皮或近根树皮。

[显微特征]　本品粉末：淡棕色或棕红色。石细胞多，类长方形、类圆形或不规则分枝状，直径30～96μm，含黄棕色块状物。筛胞大多成束，直径20～40μm，侧壁上有多数椭圆形筛域。黏液细胞类圆形，直径100～300μm 。树脂细胞纵向连接成管状，含红棕色至黄棕色树脂状物，有的埋有草酸钙方晶。木栓细胞壁稍厚，有的木化，并有纹孔。（图1）

Powder: Pale brown or brownish-red. Stone cells abundant, subrectangular, subrounded or irregularly branched, 30～96 μm in diameter, containing yellowish-brown masses. Sieve cells mostly in bundles, 20～40 μm in diameter, lateral walls with numerous elliptical sieve areas. Mucilage cells subrounded, 100～300 μm in diameter. Resin cells longitudinally connected into tubeform, containing reddish-brown to yellowish-brown resinous substance, sometimes embedded with prisms of calcium oxalate. Cork cells with slightly thickened walls, sometimes lignified and pitted. （Fig 1）



图1　土荆皮（*Pseudolarix kaempferi* 根皮或近根树皮）粉末

[Fig1　Powder of root cortex from *Pseudolarix kaempferi*]

1. 石细胞（Stone cells）　2. 筛胞（Sieve cells）　3. 黏液细胞（Mucilage cell）　4. 树脂细胞（Resin cells）
5. 木栓细胞（Cork cells）

土 茯 苓
Tufuling
RHIZOMA SMILACIS GLABRAE

本品为百合科植物光叶菝葜*Smilax glabra* Roxb. 的干燥根茎。

[显微特征] **本品粉末**：淡棕色。淀粉粒甚多，单粒类球形、多角形或类方形，直径8～48μm，脐点裂缝状、星状、三叉状或点状，大粒可见层纹；复粒由2～4分粒组成。草酸钙针晶束存在于黏液细胞中或散在，针晶长40～144μm，直径约5μm。石细胞类椭圆形、类方形或三角形，直径25～128μm，孔沟细密；另有深棕色石细胞，长条形，直径约50μm，壁三面极厚，一面菲薄。纤维成束或散在，直径22～67μm。具缘纹孔导管及管胞多见，具缘纹孔大多横向延长。（图1）

Powder: Pale brown. Starch granules abundant, simple granules subspherical, polygonal or subsquare, 8～48 μm in diameter, hilum cleft, stellate, Y-shaped or pointed, striations visible in large granules; compound granules consisting of 2～4 components. Raphides of calcium oxalate occurring in mucilage cells or scattered throughout, needle crystals 40～144 μm long, about 5 μm in diameter. Stone cells subelliptical, subsquare or triangular, 25～128 μm in diameter, with fine and dense pit canals; deep brown stone cells elongated, about 50 μm in diameter, walls heavily thickened at three sides and thin at one side. Fibres in bundles or scattered, 22～67 μm in diameter. Bordered pitted vessels and tracheids more frequent, most bordered pits transversely elongated. (Fig 1)



图1　土茯苓（*Smilax glabra* 根茎）粉末

[Fig1　Powder of rhizome from *Smilax glabra*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶（Raphides of calcium oxalate）　3. 石细胞（Stone cells）
4. 纤维（Fibres）　5. 导管与管胞（Vessels and tracheids）

土鳖虫（䗪虫）

Tubiechong

EUPOLYPHAGA SEU STELEOPHAGA

本品为鳖蠊科昆虫地鳖*Eupolyphaga sinensis* Walker或冀地鳖*Steleophaga plancyi*（Boleny） 的雌虫干燥体。

[显微特征] **本品粉末**：灰棕色。体壁碎片深棕色或黄色，表面有不规则纹理，其上着生短粗或细长刚毛，常可见刚毛脱落后的圆形毛窝，直径5～32μm；刚毛棕黄色或黄色，先端锐尖或钝圆，长12～270μm，直径10～32μm，有的具纵直纹理。横纹肌纤维无色或淡黄色，常碎断，有细密横纹，平直或呈微波状，明带较暗带为宽。（图1）

Powder: Greyish-brown. Fragments of the body walls deep brown or yellow, irregular striation in surface view, setae short thick or slender thin, usually adhered to the surface, setae pits visible, formed by setae fallen off, rounded, 5～32μm in diameter; setae brownish-yellow or yellow, sharply pointed or blunt at the tip, 12～270μm long, 10～32μm in diameter, some with longitudinal straight striations. Striated muscle fibers colourless or light yellow, usually broken, with dense transverse stripes, straight or slight undulated, the light bands wider than the dark bands. （Fig 1）



图1 土鳖虫（*Eupolyphaga sinensis* 雌虫干燥体） 粉末

[Fig1 Powder of body of female from *Eupolyphaga sinensis*]

1. 体壁碎片（Fragments of the body wall） 2. 刚毛 （Setae） 3. 横纹肌纤维（Striated muscle fibers）

大 血 藤

Daxueteng

CAULIS SARGENTODOXAE



图1 大血藤（*Sargentodoxa cuneata* 藤茎）横切面
[Fig1 Transverse section of lianoid stem from *Sargentodoxa cuneata*]
1. 木栓层（Cork） 2. 皮层（Cortex） 3. 韧皮部（Phloem）
4. 射线（Rays） 5. 木质部（Xylem） 6. 髓（Pith）

本品为木通科植物大血藤*Sargentodoxa cuneata*（Oliv.）Rehd. et Wils. 的干燥藤茎。

[显微特征] **本品横切面**：木栓层为多列细胞，含棕红色物。皮层石细胞常数个成群，有的含草酸钙方晶。维管束外韧型。韧皮部分泌细胞常切向排列，与筛管群相间隔；有少数石细胞群散在。束内形成层明显。木质部导管多单个散在，类圆形，直径约至400μm，周围有木纤维。射线宽广，外侧石细胞较多，有的含数个草酸钙方晶。髓部可见石细胞群。薄壁细胞含棕色或棕红色物。（图1、2）

Transverse section: Cork consisting of several layers of cells containing brownish-red contents. Stone cells in cortex usually in groups, some containing prisms of calcium oxalate. Vascular bundles collateral. Secretory cells in phloem arranged tangentially and alternated with sieve tubes; a few stone cell groups scattered. Fascicular cambium obvious. Vessels in xylem mostly singly and scattered, subrounded, up to about 400μm in diameter, surrounded by wood fibres. Xylem rays relatively broad, stone cells abundant in the outer part, some containing prisms of calcium oxalate. Stone cell groups in pith visible. Parenchymatous cells containing brown or brownish-red contents. (Fig 1, 2)



图2 皮层与韧皮部放大
[Fig2 Cortex and phloem magnified]
1. 木栓层（Cork） 2. 皮层（Cortex） 3. 皮层石细胞（Stone cells in cortex）
4. 分泌细胞(Secretory cells) 5. 筛管群(Group of sieve tubes) 6. 射线(Rays)

大 青 叶

Daqingye

FOLIUM ISATIDIS

本品为十字花科植物菘蓝*Isatis indigotica* Fort. 的干燥叶。

[显微特征]　本品粉末：绿褐色。下表皮细胞垂周壁稍弯曲，略成连珠状增厚；气孔不等式，副卫细胞3～4个。叶肉组织分化不明显；叶肉细胞中含蓝色细小颗粒状物，亦含橙皮苷样结晶。(图1)

Powder: Greenish-brown. Anticlinal walls of lower epidermal cells slightly sinuous and somewhat beaded; stomata anomocytic, with 3～4 subsidiary cells. Mesophyll indistinctly differentiated, mesophyll cells containing numerous blue pigment granules and hesperidin-like crystals. (Fig 1)

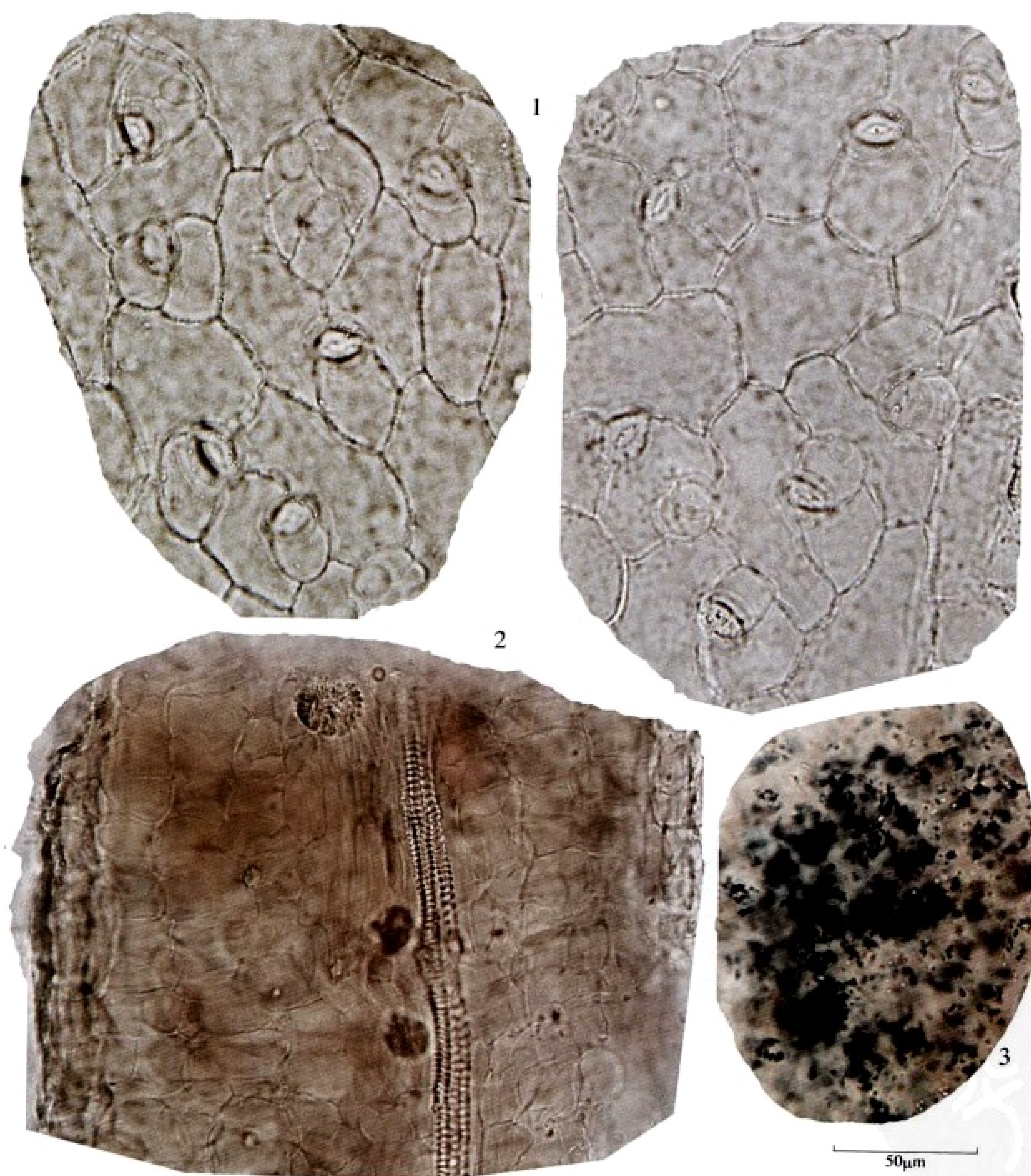


图1　大青叶（*Isatis indigotica* 叶）粉末

[Fig1　Powder of leaf from *Isatis indigotica*]

1. 下表皮细胞（Lower epidermal cells of leaf）　2. 断面观，示叶肉组织（Section view of leaf, showing mesophyll tissue）　3. 叶肉细胞含蓝色颗粒状物与橙皮苷样结晶（Mesophyll cells containing blue pigment granules and hesperidin-like crystals.）

大　黄

Dahuang

RADIX ET RHIZOMA RHEI

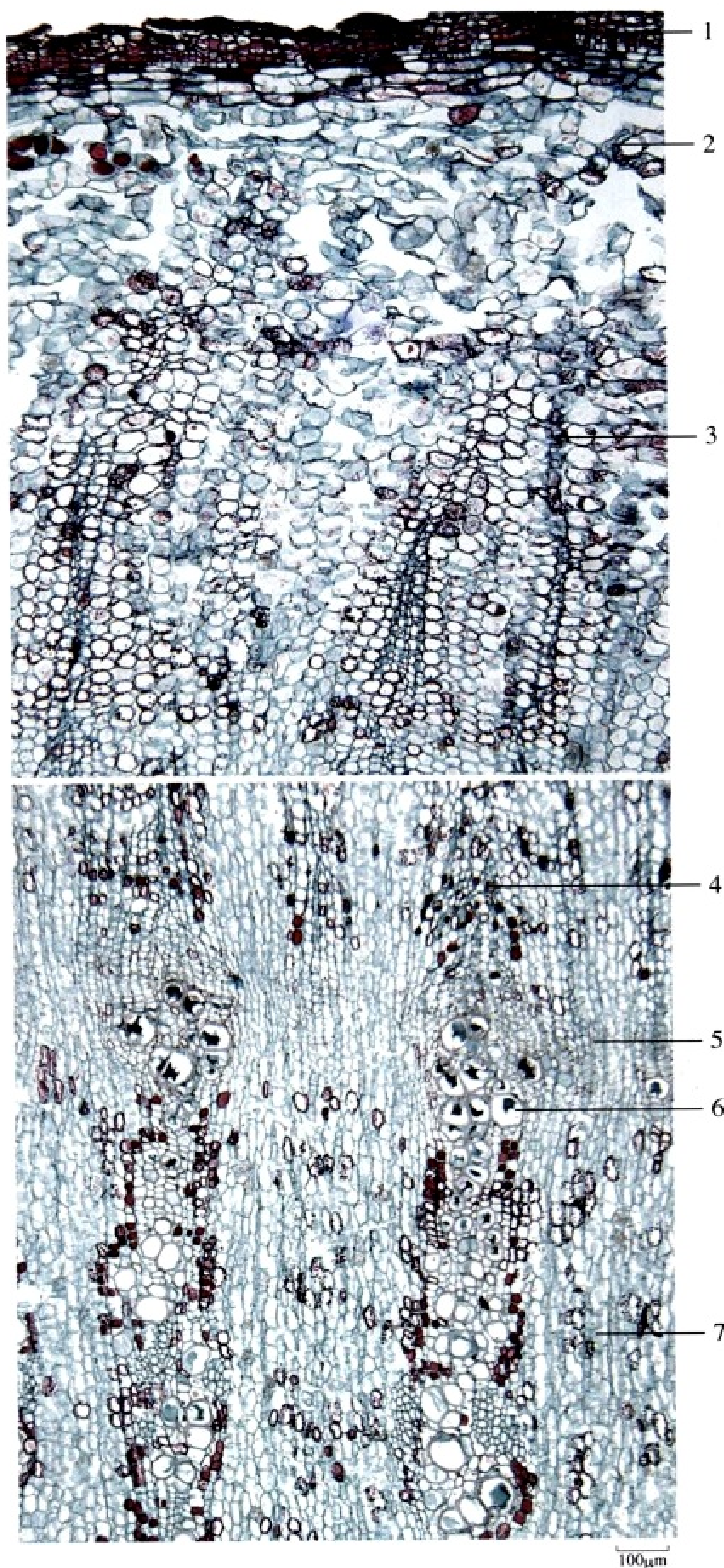


图1　大黄（*Rheum palmatum* 根）　横切面

[Fig1　Transverse section of root from *Rheum palmatum*]

1. 木栓层（Cork）　2. 皮层（Cortex）　3. 韧皮部（Phloem）　4. 韧皮部筛管群（Phloem sieve tube groups）　5. 形成层（Cambium）　6. 木质部（Xylem）　7. 木射线（Xylem ray）

本品为蓼科植物掌叶大黄*Rheum palmatum* L.、唐古特大黄*Rheum tanguticum* Maxim. ex Balf. 或药用大黄*Rheum officinale* Baill. 的干燥根及根茎。

[显微特征]　**本品根横切面**：木栓层及栓内层大多已除去。韧皮部筛管群明显；薄壁组织发达。形成层成环。木质部射线较密，宽2～4列细胞，内含棕色物；导管非木化，常一至数个相聚，稀疏排列。薄壁细胞含草酸钙簇晶，并含多数淀粉粒。（图1）

Transverse section of root: Cork and phelloderm mostly removed. Sieve tube groups distinct in phloem, parenchyma abundant. Cambium in a ring. Xylem rays relatively dense, 2-4 cells wide, containing bround masses; vessels unlignified, usually single or in grouped, sparsely arranged. Parenchymatous cells containing clusters of calcium oxalate and abundant starch granules.（Fig 1）

根茎横切面：髓部宽广，其中常见黏液腔，内有红棕色物；异型维管束散在，形成层成环，木质部位于形成层外方，韧皮部位于形成层内方，射线呈星状射出。(图2、3)

Transverse section of rhizome： Pith broad, usually showing mucilage cavities, containing reddish-brown masses; abnormal vascular bundles scattered, cambium in a ring, xylem at the outside and phloem at the inside of cambium, rays stellate. (Fig 2, 3)

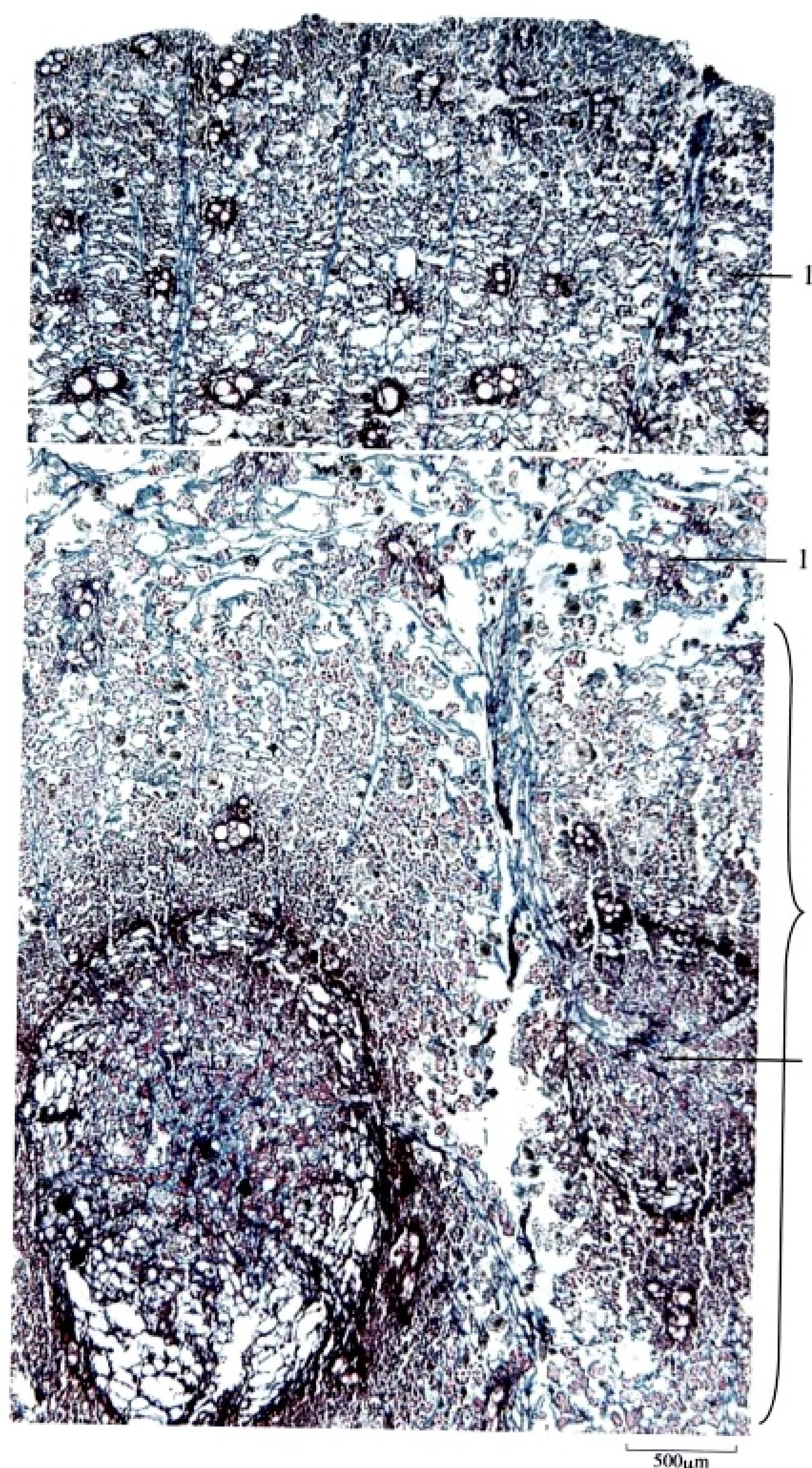


图2 大黄（*Rheum palmatum* 根茎）横切面
[Fig2 Transverse section of rhizome from *Rheum palmatum*]
1. 次生木质部（Secondary xylem） 2. 髓部（Pith）
3. 异型维管束（Abnormal vascular bundles）

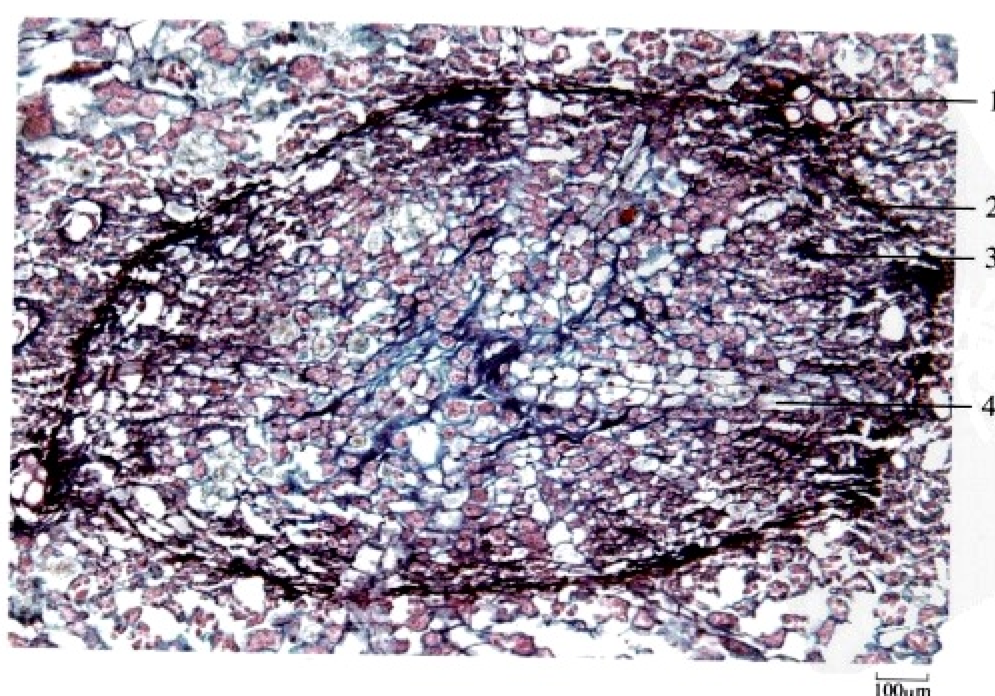


图3 异型维管束放大
[Fig3 Abnormal vascular bundles magnified]
1. 木质部（Xylem） 2. 形成层（Cambium） 3. 韧皮部（Phloem） 4. 射线（Rays）

本品粉末：黄棕色。草酸钙簇晶直径20～160μm，有的至196μm。具缘纹孔导管、网纹导管、螺纹导管及环纹导管非木化。淀粉粒甚多，单粒类球形或多角形，直径3～45μm，脐点星状；复粒由2～8分粒组成。（图4）

Powder: Yellowish-brown. Clusters of calcium oxalate 20 ～ 160μm, sometimes up to 196μm in diameter. Bordered pitted, reticulated, spiral and annular vessels unlignified. Starch granules fairly abundant, single granules subspheroidal or polygonal, 3～45μm in diameter, hilum stellate; compound granules consisting of 2～8 components. （Fig 4）



图4 大黄（*Rheum palmatum* 根茎） 粉末

[Fig4 Powder of rhizome from *Rheum officinale*]

1. 草酸钙簇晶（Clusters of calcium oxalate） 2. 导管（Vessels） 3. 淀粉粒（Starch granules）

大　　蓟

Daji

HERBA CIRSII JAPONICI

本品为菊科植物蓟*Cirsium japonicum* Fisch. ex DC. 的干燥地上部分。

[显微特征]　本品叶表面观：上表皮细胞多角形；下表皮细胞类长方形，垂周壁波状弯曲。气孔不定式或不等式，副卫细胞3～5个。非腺毛4～18细胞，顶端细胞细长而扭曲，直径约7μm，壁具交错的角质纹理。（图1）

Surface view of leaf: The upper epidermal cells polygonal; the lower epidermal cells subrectangular, anticlinal walls sinuous. Stomata anomocytic or anisocytic, subsidiary cells 3～5. Non-glandular hairs 4～18 celled, the apical cells slender and twisted, about 7μm in diameter, walls with crisscross striated cuticle. (Fig 1)



图1　大蓟（*Cirsium japonicum* 叶）表面观

[Fig1　Surface view of leaf from *Cirsium japonicum*]

1. 上表皮细胞（Upper epidermal cells）　2. 下表皮细胞（Lower epidermal cells）　3. 非腺毛（Non-glandular hairs）

大 腹 皮

Dafupi

PERICARPIUM ARECAE

本品为棕榈科植物槟榔*Areca catechu* L. 的干燥果皮。

[显微特征]　本品粉末：黄白色或黄棕色。中果皮纤维成束，细长，直径8～15μm，壁微木化，纹孔明显，周围细胞中含有圆簇状硅质块，直径约8μm。内果皮细胞呈不规则多角形、类圆形或椭圆形，直径48～88μm，纹孔明显。（图1）

Powder: Yellowish-white or yellowish-brown. Mesocarp fibres in bundles, fine and long, 8～15μm in diameter, slightly lignified, pits visible; surrounding cells containing silica body of cluster-shaped, about 8μm in diameter. Endocarp cells irregular polygonal, subrounded or elliptical, 48～88μm in diameter, and pits visible. (Fig 1)



图1　大腹皮（*Areca catechu* 果皮）粉末

[Fig1　Powder of pericarp from *Areca catechu*]

1. 纤维（Fibres）　2. 内果皮细胞（Endocarp cells）

山　麦　冬
Shanmaidong
RADIX LIRIOPES

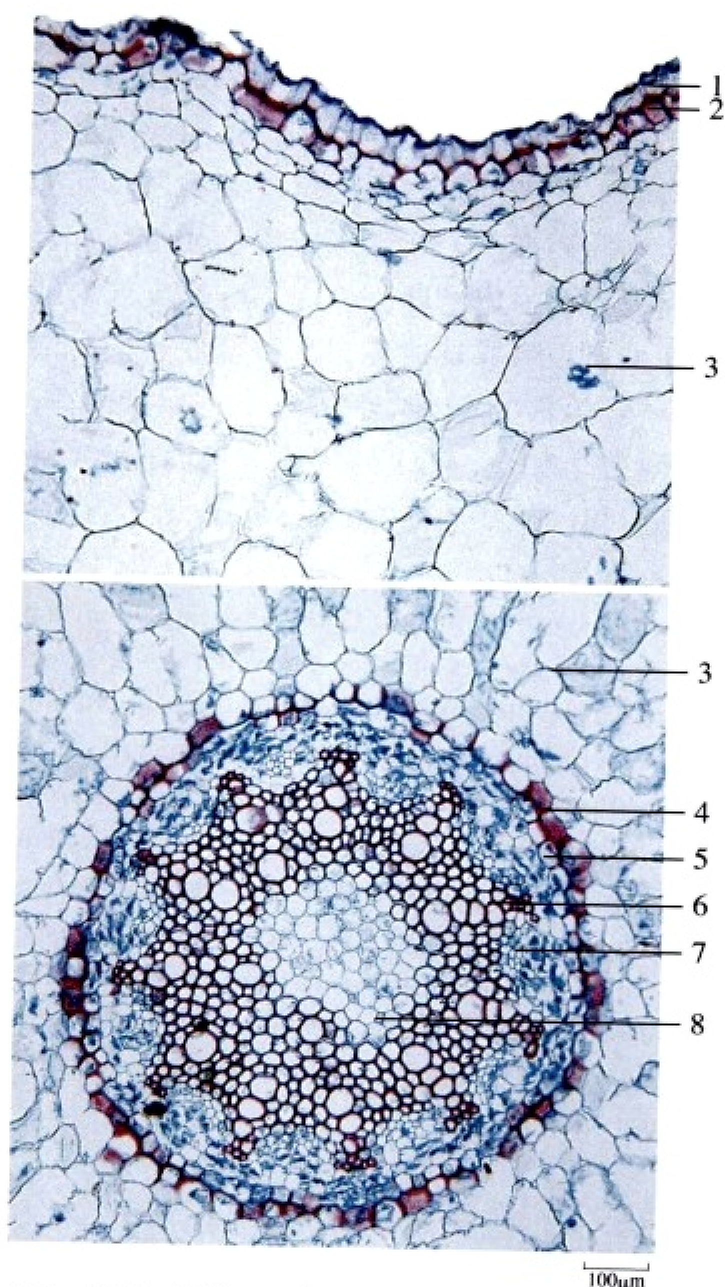


图1　山麦冬（*Liriope spicata* var. *prolifera* 块根）横切面
[Fig1　Transverse section of tuber root from *Liriope spicata* var. *prolifera*]
1. 表皮（Epidermis）　2. 外皮层（Exodermis）　3. 皮层（Cortex）　4. 石细胞（Stone cells）　5. 内皮层（Endodermis）　6. 木质部束（Xylem bundles）　7. 韧皮部束（Phloem bundles）　8. 髓（Pith）

本品为百合科植物湖北麦冬*Liriope spicata*（Thunb.）Lour. var. *prolifera* Y. T. Ma或短葶山麦冬*Liriope muscari*（Decne.）Baily的干燥块根。

[显微特征]　本品横切面：**湖北麦冬**　表皮为1列薄壁细胞。外皮层为1列细胞。皮层宽广，薄壁细胞含草酸钙针晶束，针晶长27～60μm；内皮层细胞壁增厚，木化，有通道细胞，外侧为1～2列石细胞，其内壁及侧壁增厚，纹孔细密。中柱甚小，韧皮部束7～15个，各位于木质部束的星角间，木质部束内侧的木化细胞连结成环层。髓小，薄壁细胞类圆形。（图1、2）

Transverse section: Root of *Liriope spicata* var. *prolifera:* Epidermis consisting of 1 layer of parenchymatous cells. Exodermis 1 layer of cells. Cortex broad, parenchymatous cells containing raphides of calcium oxalate, raphide 27 ～ 60 μm long; endodermal cells with thickened and lignified walls, passage cells found, stone cells 1～2 layers, lying at the outside of endodermis, with thickened inner and lateral walls, finely and densely pitted. Stele fairly small, phloem bundles 7～15, each located between 2 xylem arms, the lignified cells in the inner side of xylem bundles linking up to a ring. Pith small, parenchymatous cells subrounded. (Fig 1, 2)

短葶山麦冬　根被为3～6列木化细胞。针晶束长25～46μm。内皮层外侧为1列石细胞。韧皮部束16～20个。

Root of *Liriope muscari:* Velamen consisting of 3～6 layers of lignified cells. Raphides 25～46μm long. The outside of endodermis showing 1 layer of stone cells. Phloem bundles 16～20.

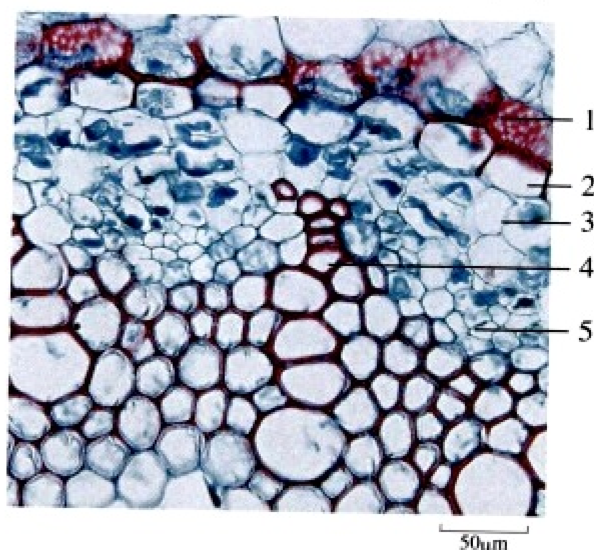


图2　内皮层与中柱（部分）放大
[Fig2　Endodermis and stele partially magnified]
1. 石细胞（Stone cells）　2. 内皮层细胞（Endodermal cells）　3. 中柱鞘细胞（Pericyclic cells）　4. 木质部束（Xylem bundles）　5. 韧皮部束（Phloem bundles）

山 豆 根

Shandougen

RADIX ET RHIZOMA SOPHORAE TONKINENSIS

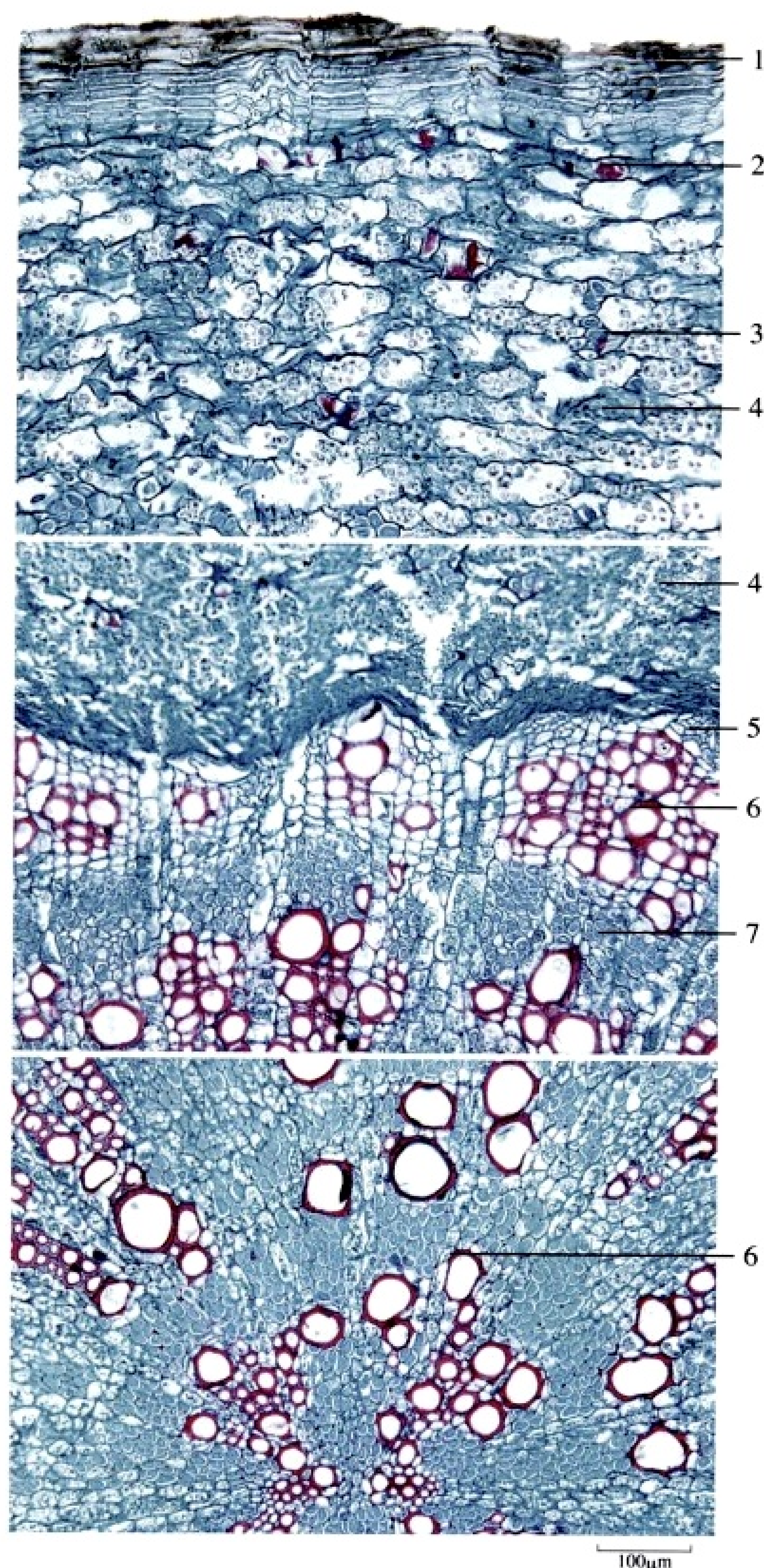


图1 山豆根（*Sophora tonkinensis* 根）横切面

[Fig1 Transverse section of root from *Sophora tonkinensis*]

1. 木栓层（Cork） 2. 含晶细胞（Crystal cells） 3. 纤维束（Fibre bundles） 4. 韧皮部（Phloem） 5. 形成层（Cambium） 6. 木质部（Xylem） 7. 木纤维（Xylem fibres）

本品为豆科植物越南槐*Sophora tonkinensis* Gagnep. 的干燥根及根茎。

[显微特征] **本品根横切面**：木栓层为数列至十数列细胞；栓内层外侧的1～2列细胞含草酸钙方晶，断续形成含晶细胞环，含晶细胞的壁木化增厚。栓内层与韧皮部均散有纤维束。形成层成环。木质部发达，射线宽1～8列细胞；导管类圆形，大多单个散在，或2至数个相聚，有的含黄棕色物。木纤维成束散在。薄壁细胞含淀粉粒，少数含方晶。（图1、2）

Transverse section of root: Cork consisting of several to 10 or more layers of cells. The outer 1 ~ 2 layers of cells in phelloderm containing prisms of calcium oxalate, forming an interrupted ring of crystal cells, with lignified and thickened walls. Fibre bundles scattered in phelloderm and phloem. Cambium in a ring. Xylem developed, rays 1 ~ 8 cells wide; vessels subrounded, mostly singly scattered or 2 to several in groups, some containing yellowish-brown contents; xylary fibres grouped and scattered. Parenchymatous cells mostly containing starch granules, and a few cells containing prisms. (Fig 1, 2)

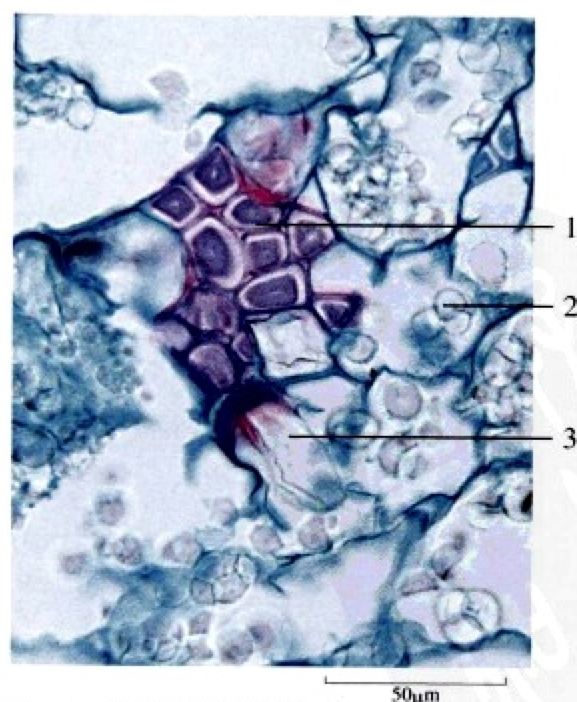


图2 含晶细胞及纤维束放大

[Fig2 Crystal cells and fibre bundles magnified]

1. 纤维束（Fibre bundles） 2. 淀粉粒（Starch granules） 3. 草酸钙方晶（Prisms of calcium oxalate）

山 茱 萸

Shanzhuyu

FRUCTUS CORNI

本品为山茱萸科植物山茱萸*Cornus officinalis* Sieb. et Zucc. 的干燥成熟果肉。

[显微特征] **本品粉末**：红褐色。果皮表皮细胞橙黄色，表面观多角形或类长方形，直径16～30μm，垂周壁连珠状增厚，外平周壁颗粒状角质增厚，胞腔含淡橙黄色物。中果皮细胞橙棕色，多皱缩。草酸钙簇晶少数，直径12～32μm。石细胞类方形、卵圆形或长方形，纹孔明显，胞腔大。(图1)

Powder: Reddish-brown. Epidermal cells of pericarp polygonal or subrectangular in surface view, 16 ~ 30μm in diameter, anticlinal walls beaded, outer periclinal walls granularly cutinized and thickened, lumina containing pale orange-yellow contents. Cells of mesocarp orange-brown, mostly shrunken. Clusters of calcium oxalate rare, 12 ~ 32μm in diameter. Stone cells subsquare, ovoid or rectangular, pits obvious and each with a large lumen. (Fig 1)



图1 山茱萸（*Cornus officinalis* 果肉）粉末

[Fig1 Powder of sarcocarp from *Cornus officinalis*]

1. 果皮表皮细胞[Epidermal cells of pericarp（a.表面观Surface view b.断面观Section view）] 2. 中果皮细胞（Mesocarp cells） 3. 草酸钙簇晶（Clusters of calcium oxalate） 4. 石细胞（Stone cells）

山　　药

Shanyao

RHIZOMA DIOSCOREAE

本品为薯蓣科植物薯蓣*Dioscorea opposita* Thunb. 的干燥根茎。

[显微特征]　**本品粉末**：类白色。淀粉粒单粒扁卵形、三角状卵形、类圆形或矩圆形，直径8～35μm，脐点点状、人字状、十字状或短缝状，可见层纹；复粒稀少，由2～3分粒组成。草酸钙针晶束存在于黏液细胞中，长约至240μm，针晶粗2～5μm。具缘纹孔导管、网纹导管、螺纹导管及环纹导管直径12～48μm。(图1)

Powder: Whitish. Simple starch granules compressed-ovoid, deltoid-ovoid, subrounded or oblong, 8～35μm in diameter, hilum pointed, V-shaped, crosscriss or shortly cleft, striations visible. Compound starch granules few, usually consisting of 2～3 granules. Mucilage cells containing raphides of calcium oxalate, up to 240μm long and needle crystals 2～5μm wide. Vessels bordered-pitted, reticulated, spiral and annular, 12～48μm in diameter. (Fig 1)

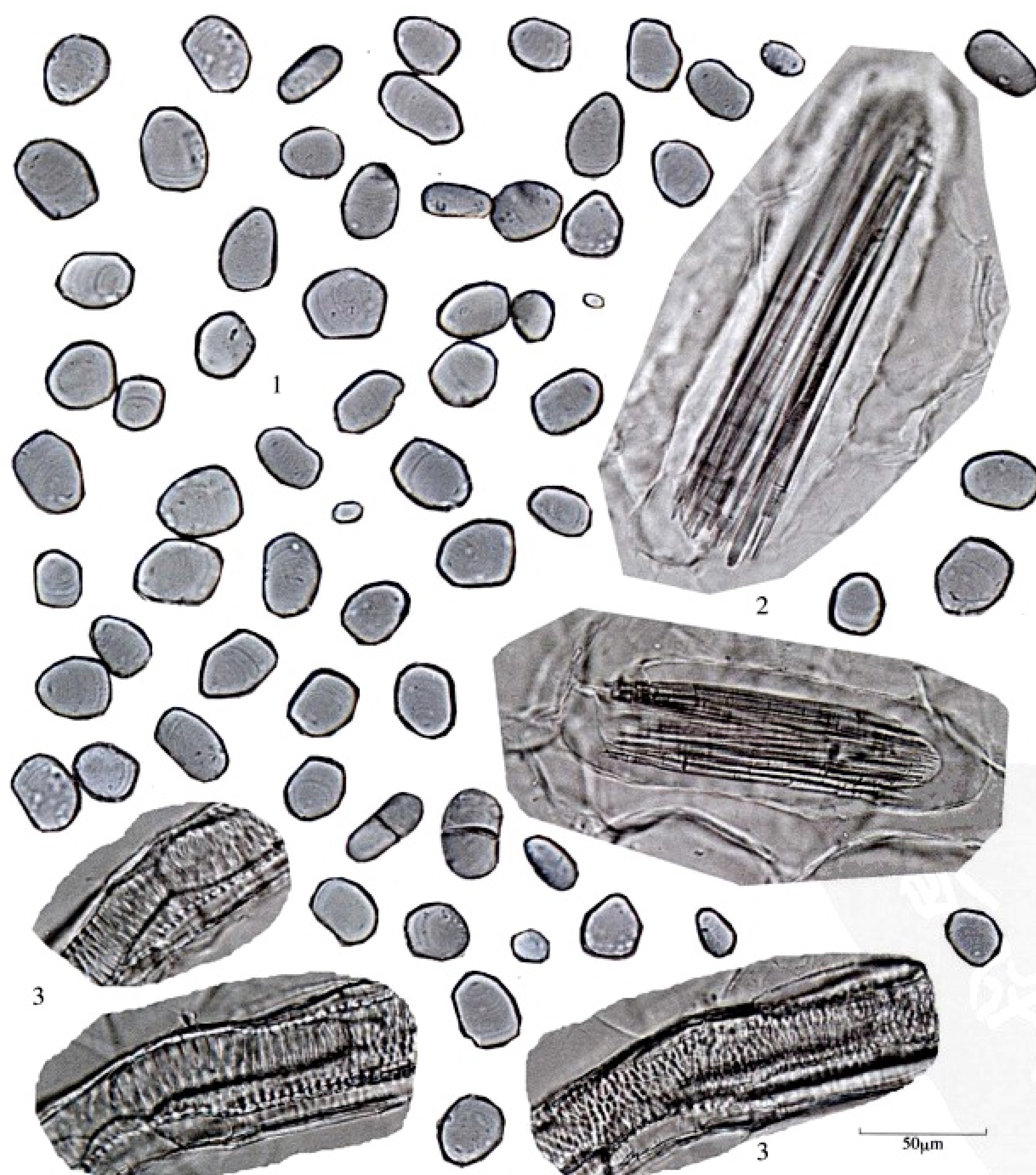


图1　山药（*Dioscorea opposita* 根茎）粉末

[Fig1　Powder of rhizome from *Dioscorea opposita*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶（Raphides of calcium oxalate）　3. 导管（Vessels）

山　　柰

Shannai

RHIZOMA KAEMPFERIAE

本品为姜科植物山柰*Kaempferia galanga* L. 的干燥根茎。

[显微特征]　**本品粉末**：类黄白色。淀粉粒众多，主要为单粒，圆形、椭圆形或类三角形，多数扁平，直径5～30μm，脐点、层纹均不明显。油细胞类圆形或椭圆形，直径40～130μm，壁较薄，胞腔内含浅黄绿色或浅紫红色油滴。螺纹导管直径18～37μm。色素块不规则形，黄色或黄棕色。(图1)

Powder: Yellowish-white. Starch granules abundant, mainly simple, spheroid, ellipsoidal or subtriangular, mostly flattened, 5～30μm in diameter, hilum and striations indistinct. Oil cells subrounded or elliptical, 40～130μm in diameter, thin-walled, lumina containing yellowish-green or purplish-red oil drops. Spiral vessels 18～37μm in diameter. Coloured masses irregular, yellow or yellowish-brown. (Fig 1)

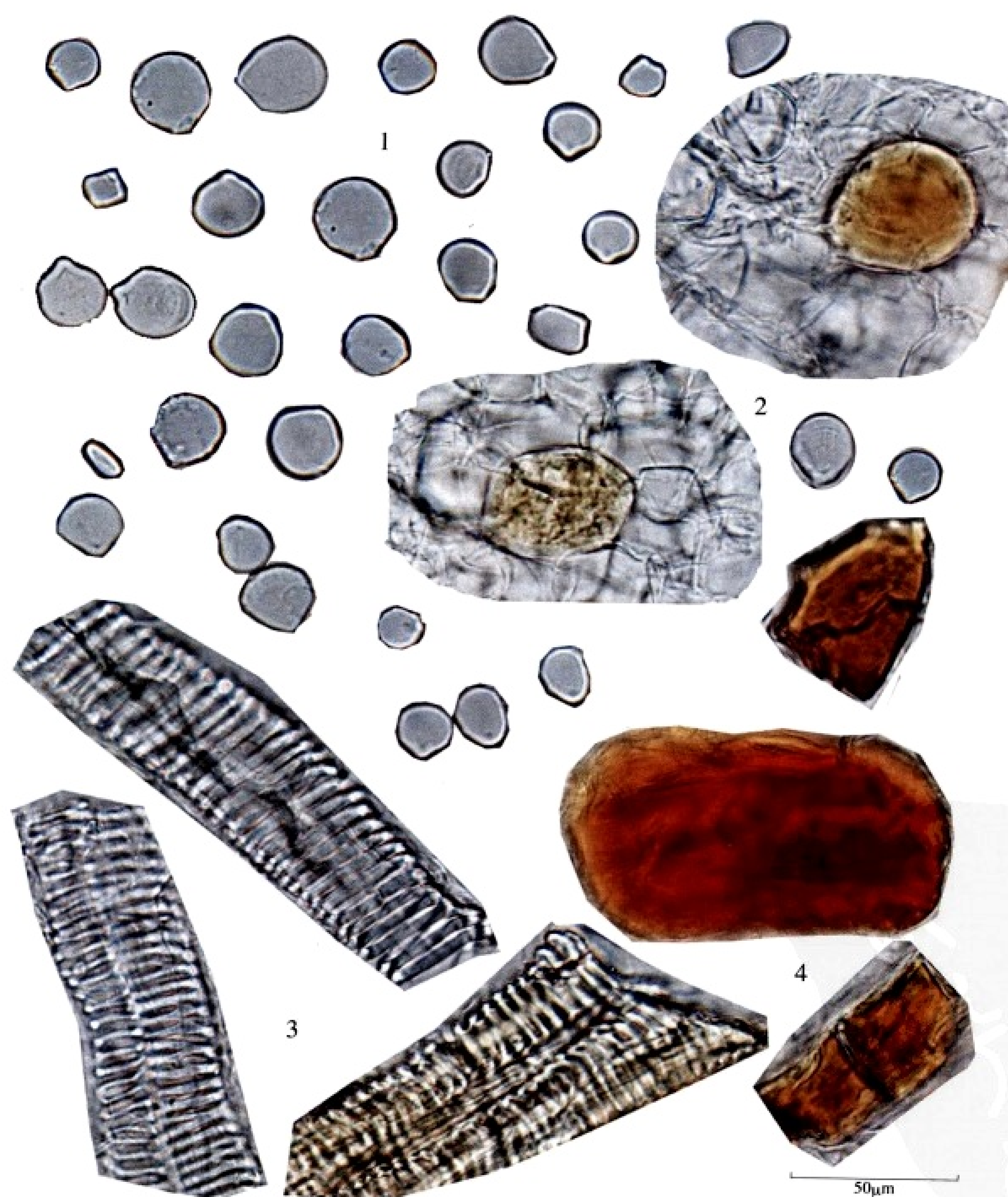


图1　山柰（*Kaempferia galanga* 根茎）粉末

[Fig1　Powder of rhizome from *Kaempferia galanga*]

1. 淀粉粒（Starch granules）　2. 油细胞（Oil cells）　3. 导管（Vessels）　4. 色素块（Masses of pigment）

山　楂　叶

Shanzhaye

FOLIUM CRATAEGI

本品为蔷薇科植物山里红*Crataegus pinnatifida* Bge. var. *major* N. E. Br. 或山楂*Crataegus pinnatifida* Bge. 的干燥叶。

［显微特征］　本品粉末：绿色至棕黄色。草酸钙簇晶直径10～30μm，草酸钙方晶直径15～30μm，散在或分布于叶迹维管束或纤维束旁。导管为螺纹导管，直径20～40μm。非腺毛为单细胞，长圆锥形，基部直径30～40μm。纤维成束，直径约15μm，壁增厚。(图1)

Powder: Green to brownish-yellow. Clusters of calcium oxalate 10～30μm in diameter, prisms of calcium oxalate 15～30μm in diameter, scattered or accompanied by leaf trace bundles or fibre bundles. Spiral vessels 20～40μm in diameter. Non-glandular hairs unicellular, long conical, 30～40μm in diameter at base. Fibres in bundle, 15μm in diameter, with thickened walls.（Fig 1）



图1　山楂叶（*Crataegus pinnatifida* var. *major*　叶）粉末

[Fig1　Powder of leaf from *Crataegus pinnatifida* var. *major*]

1. 草酸钙簇晶（Clusters of calcium oxalate）　2. 草酸钙方晶（Prisms of calcium oxalate）　3. 导管（Vessels）　4. 非腺毛（Non-glandular hairs）　5. 纤维（Fibres）　6. 叶表皮细胞及气孔（Epidermal cells of leaf and stomata）

山　慈　菇

Shancigu

PSEUDOBULBUS CREMASTRAE SEU PLEIONES

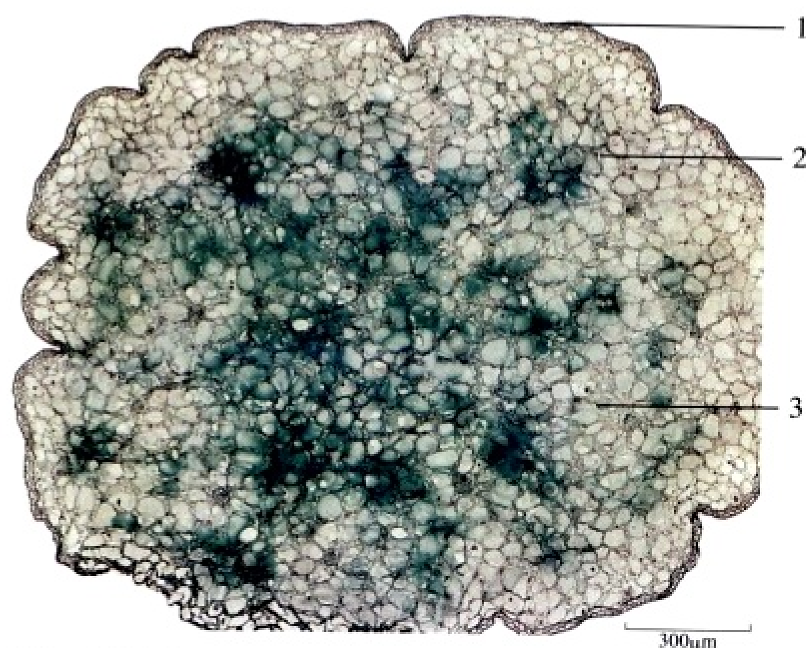


图1　山慈菇（*Cremastra appendiculata* 假鳞茎）横切面

[Fig1　Transverse section of the pseudobulb from *Cremastra appendiculata*]

1. 表皮（Epidermis）　2. 薄壁细胞（Parenchyma cells）　3. 维管束（Vascular bundles）

本品为兰科植物杜鹃兰*Cremastra appendiculata*（D. Don）Makino、独蒜兰*Pleione bulbocodioides*（Franch.）Rolfe或云南独蒜兰*Pleione yunnanensis* Rolfe的干燥假鳞茎。前者习称"毛慈菇"，后二者习称"冰球字"。

［显微特征］　本品横切面：毛慈菇最外层为一层扁平的表皮细胞，其内有2～3列细胞，壁稍厚，浅黄色，再向内为大的类圆形薄壁细胞，含黏液质，并含有淀粉粒。近表皮处的薄壁细胞中含有草酸钙针晶束，长70～150μm。维管束散在，外韧型。（图1～3）

Transverse section of maocigu: The outermost consisting of a layer of flattened epidermal cells, 2 ~ 3 layers of yellowish slightly thickened cells beneath, inward presenting large subrounded parenchymatous cells containing mucilage and starch granules. Raphides of calcium oxalate contained in parenchymatous cells near the epidermis, 70 ~ 150μm long. Collateral vascular bundles scattered. (Fig 1～3)

冰球子　表皮细胞切向延长，淀粉粒存在于较小的薄壁细胞中，维管束鞘纤维半月形，偶有两半月形。

Transverse section of Bingqiuzi: Epidermal cells tangentially elongated, starch granules occurring in small parenchymatous cells, fibres of vascular bundle sheath crescent, occasionally double crescent.

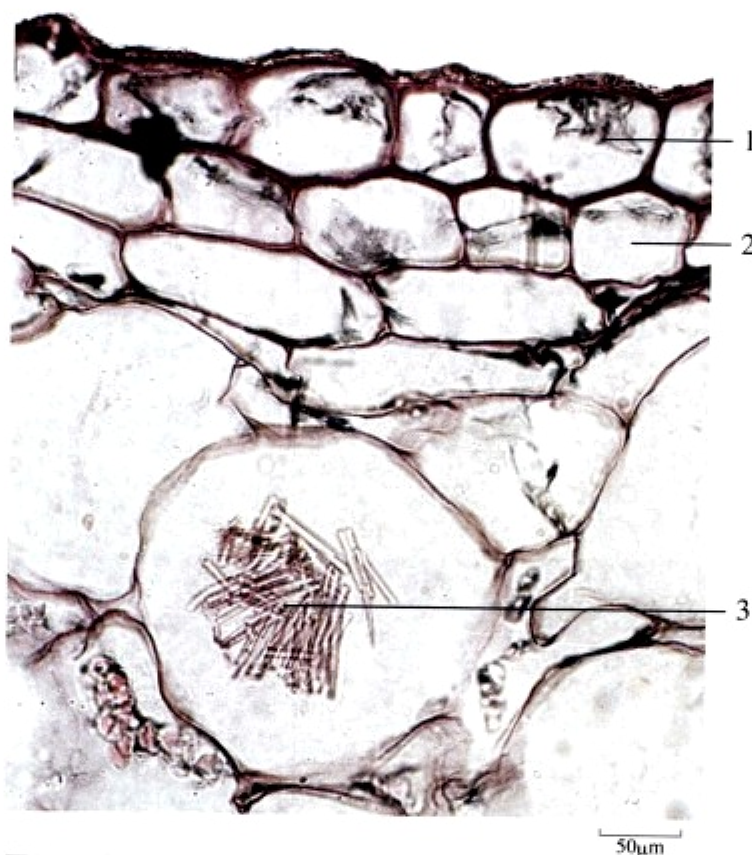


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 表皮细胞（Epidermal cells）　2. 厚壁细胞（Thickened cells）

3. 黏液细胞和草酸钙针晶束（Mucilage cells and raphides of calcium oxalate）

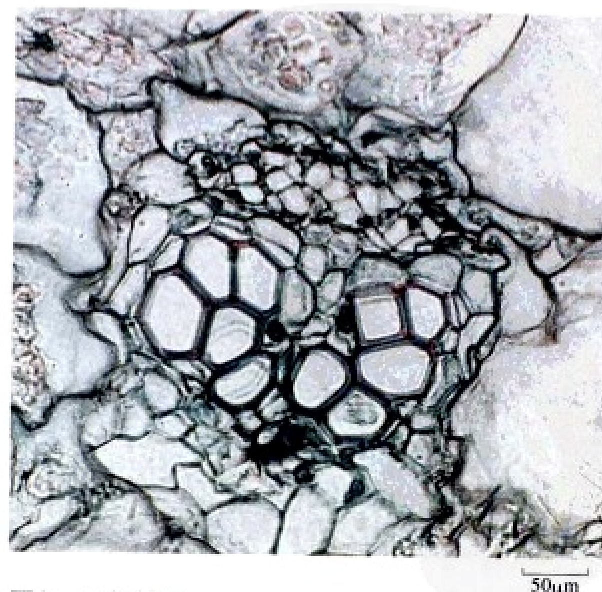


图3　示维管束

[Fig3　Showing vascular bundle]

千 年 健

Qiannianjian

RHIZOMA HOMALOMENAE

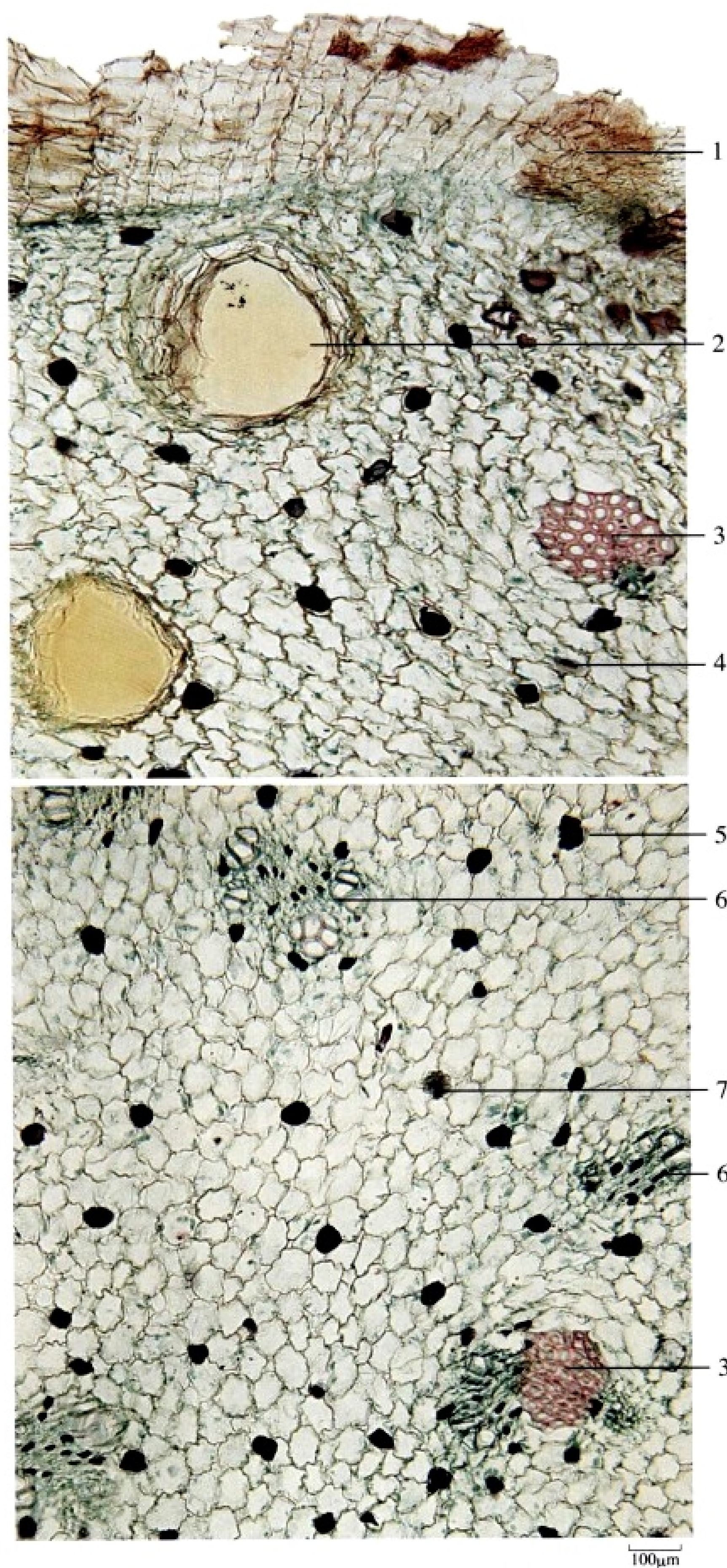


图1 千年健（*Homalomena occulta* 根茎） 横切面

[Fig1 Transverse section of rhizome from *Homalomena occulta*]

1. 木栓层（Cork） 2. 分泌腔（Secretory cavities） 3. 纤维束（Fibre bundles） 4. 黏液细胞（Mucilage cells） 5. 分泌细胞（Secretory cells） 6. 维管束（Vascular bundles） 7. 草酸钙簇晶（Clusters of calcium oxalate）

本品为天南星科植物千年健*Homalomena occulta*（Lour.）Schott的干燥根茎。

[显微特征] **本品横切面**：木栓细胞有的残存，棕色。基本组织中散有大的分泌腔，由数层木栓细胞组成；分泌细胞靠外侧较多，内含黄色至棕色分泌物；黏液细胞较大，内含草酸钙针晶束；草酸钙簇晶散在；维管束外韧型及周木型，散生，外韧型维管束外侧常伴有纤维束，单一纤维束少见，纤维壁较厚，木化。（图1、2）

Transverse section: Some cork cells remained, brown. Ground tissue scattered with large secretory cavities consisting of several layers of cork cells; most secretory cells present in the outer side, containing yellow to brown secretion. Mucilage cells relatively large, containing raphides of calcium oxalate; clusters of calcium oxalate scattered; vascular bundles collateral and amphivasal, scattered throughout. Collateral bundles usually accompanied by fibre bundles outside, isolated fibre bundles rarely found, fibre walls thickened and lignified. (Fig 1,2)

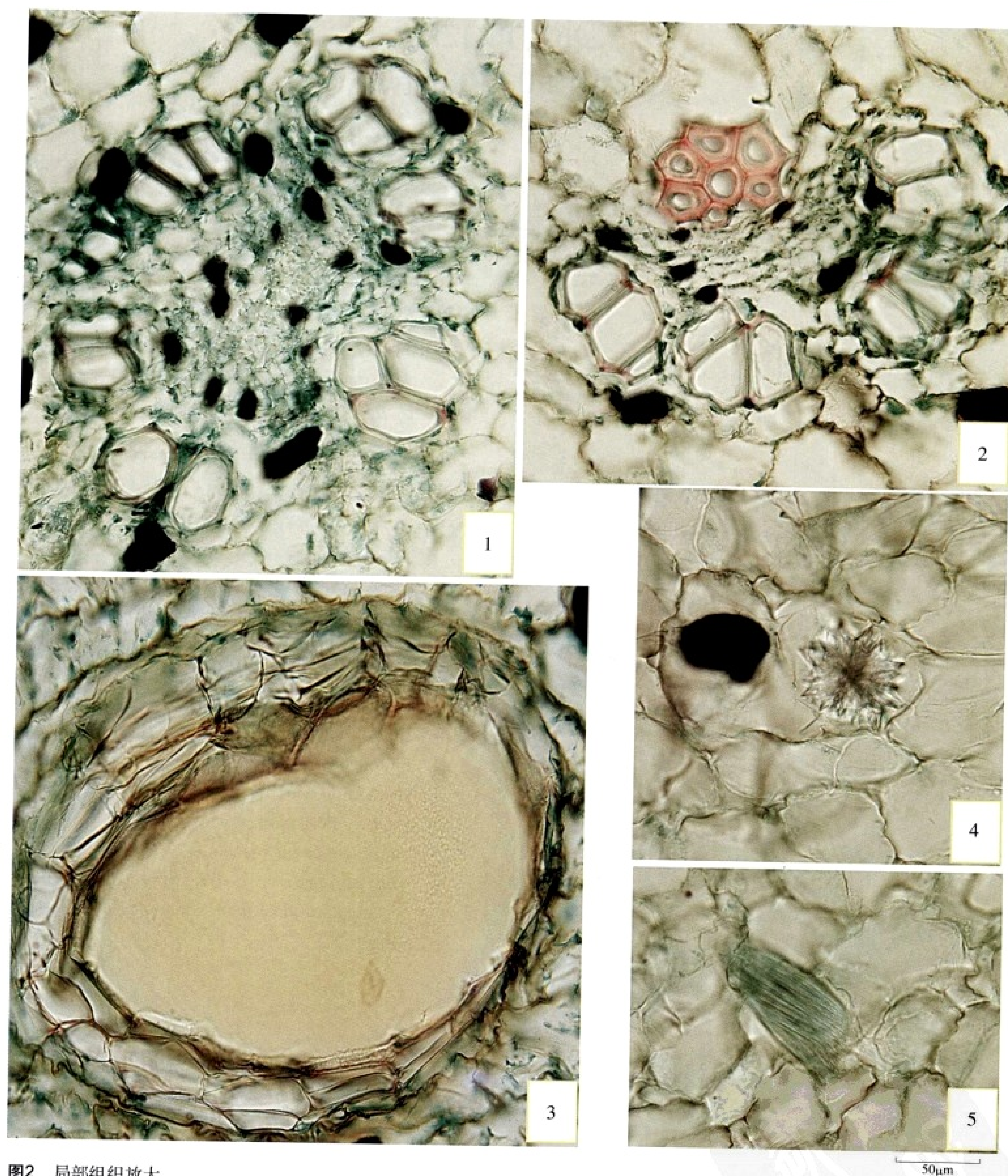


图2 局部组织放大
[Fig2 Partial tissue magnified]
1. 周木型维管束(Amphivasal vascular bundles) 2. 外韧型维管束(Collateral vascular bundles) 3. 分泌腔(Secretory cavity) 4. 草酸钙簇晶(Clusters of calcium oxalate) 5. 黏液细胞含草酸钙针晶 (Mucilage cells containing raphides of calcium oxalate)

千 金 子

Qianjinzi

SEMEN EUPHORBIAE

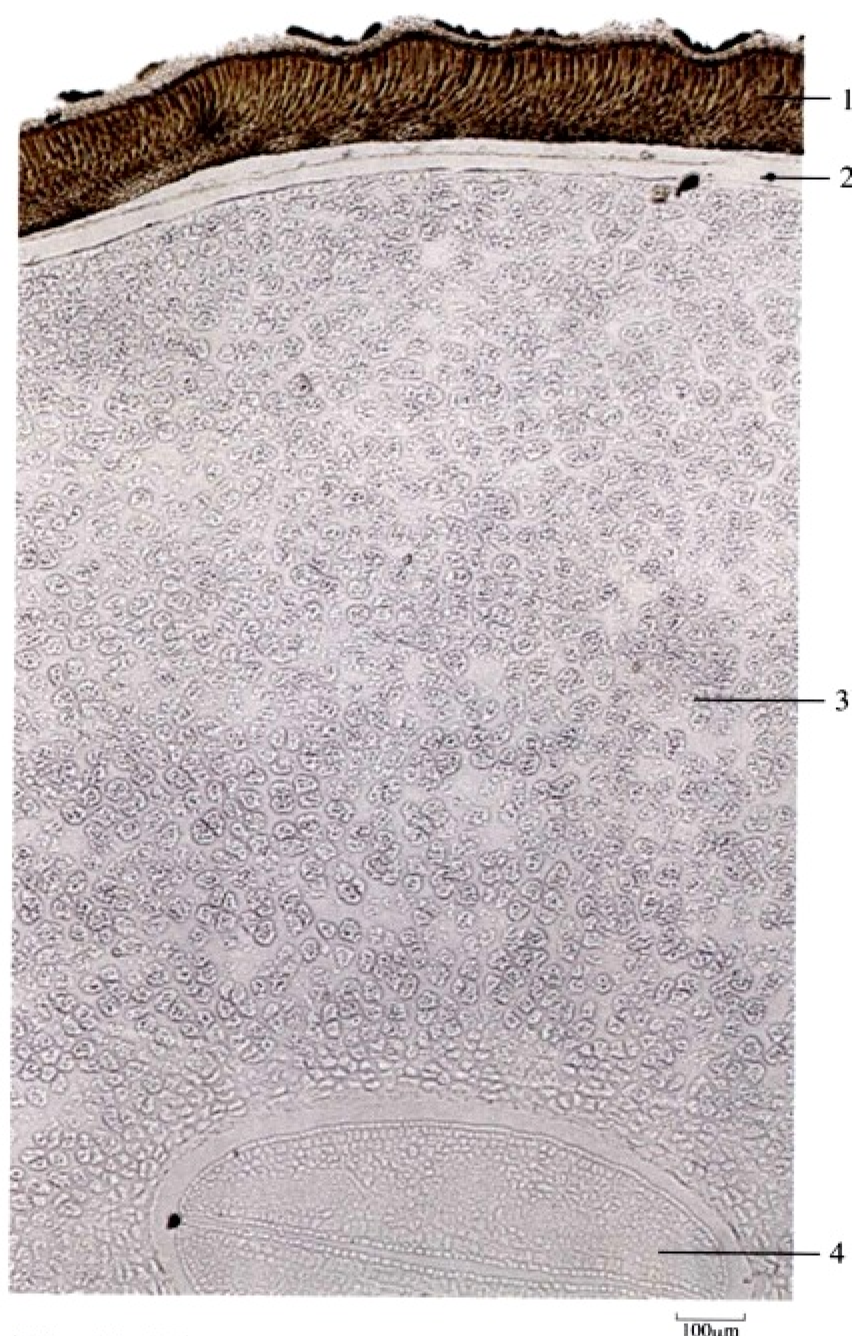


图1 千金子（*Euphorbia lathyris* 种子） 横切面

[Fig1 Transverse section of seed from *Euphorbia lathyris*]

1. 种皮（Testa） 2. 外胚乳（Perisperm） 3. 内胚乳（Endosperm） 4. 子叶（Cotyledons）

本品为大戟科植物续随子*Euphorbia lathyris* L. 的干燥成熟种子。

[显微特征] **本品横切面**：种皮表皮细胞波齿状，外壁较厚，细胞内含棕色物质；下方为1～3列薄壁细胞组成的下皮；内表皮为1列类方形栅状细胞，其侧壁内方及内壁明显增厚。内种皮栅状细胞1列，棕色，细长柱状，壁厚，木化，有时可见壁孔。外胚乳为数列类方形薄壁细胞；内胚乳细胞类圆形；子叶细胞方形或长方形，均含糊粉粒。（图1、2）

Transverse section: Epidermal cells of testa undulated, outer wall relatively thickened, containing brown substances; hypodermis consisting of 1 ~ 3 layers of parenchymatous cells; the inner epidermis consisting of 1 layer of subsquare palisade cells, the inner part of lateral walls and inner walls thickened distinctly. Palisade cells of endotesta 1 row, brown, slender cylindrical, with thickened and lignified walls, sometimes pits visible. Perisperm consisting of several layers of subsquare parenchymatous cells; cells of endosperm subrounded, cells of cotyledons square or rectangular; all of them containing aleurone grains. (Fig 1, 2)



图2 种皮放大

[Fig2 Testa magnified]

1. 种皮表皮细胞（Epidermal cells of testa） 2. 下皮细胞（Hypodermis cells） 3. 内表皮细胞（Endodermal cells）
4. 内种皮栅状细胞（Palisade cells of endotesta）

川　木　香

Chuanmuxiang

RADIX VLADIMIRIAE

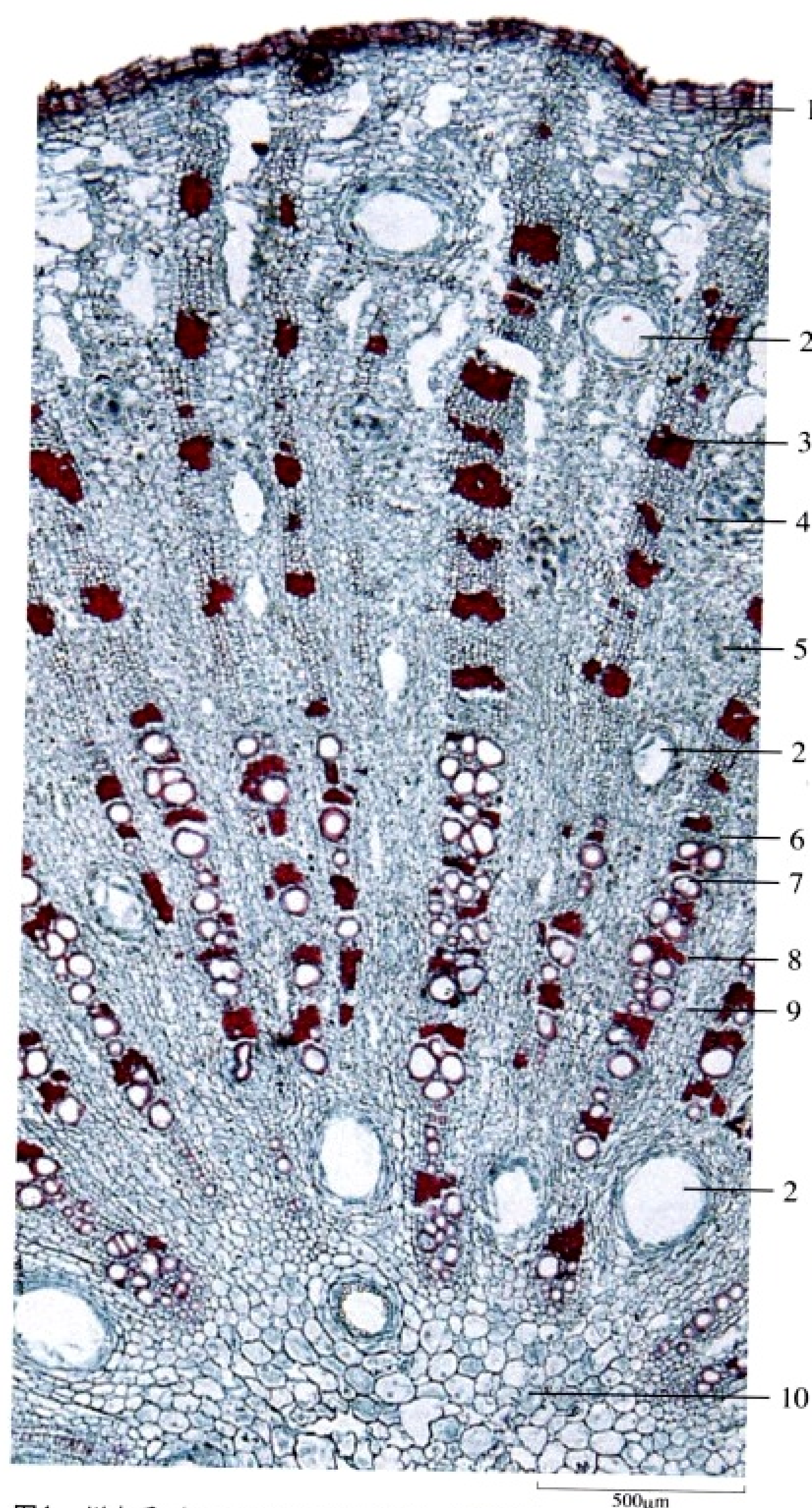


图1　川木香（*Vladimiria souliei* 根）横切面

[Fig1　Transverse section of root from *Vladimiria souliei*]

1. 木栓层（Cork）　2. 油室（Oil cavities）　3. 韧皮部纤维束（Phloem fibre bundles）　4. 韧皮射线（Phloem rays）　5. 韧皮部（Phloem）　6. 形成层（Cambium）　7. 木质部（Xylem）　8. 木质部纤维束（Xylem fibre bundles）　9. 木射线（Xylem rays）　10. 髓（Pith）

本品为菊科植物川木香*Vladimiria souliei*（Franch.）Ling或灰毛川木香*Vladimiria souliei*（Franch.）Ling var. *cinerea* Ling的干燥根。

[显微特征]　本品横切面：木栓层为数列棕色细胞。韧皮部射线较宽；筛管群与纤维束以及木质部的导管群与纤维束均呈交互径向排列，呈整齐的放射状。形成层环波状弯曲，纤维束黄色，木化，并伴有石细胞。髓完好或已破裂。油室散在于射线或髓部薄壁组织中。薄壁细胞可见菊糖。（图1、2）

Transverse section: Cork consisting of several layers of brown cells. Phloem ray relatively broad; sieve tube groups alternally arranged with fibre bundles radially, xylem vessel groups alternated with fibre bundles either, forming regular radiated pattern. Cambium ring undulate. Fibre bundles yellow, lignified, accompanied by stone cells. Pith intact or withered. Oil cavities scattered in rays and throughout parenchyma in pith. Inulin found in parenchymatous cells. (Fig 1, 2)

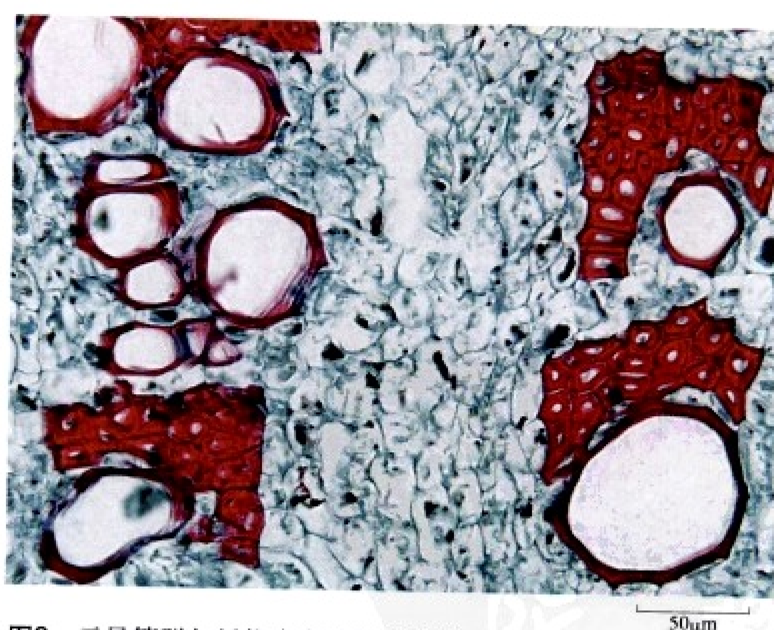


图2　示导管群与纤维束交互径向排列

[Fig2　Showing alternately arranged vessel groups and fibre bundles]

川　贝　母

Chuanbeimu

BULBUS FRITILLARIAE CIRRHOSAE

本品为百合科植物川贝母*Fritillaria cirrhosa* D. Don、暗紫贝母*Fritillaria unibracteata* Hsiao et K. C. Hsia、甘肃贝母*Fritillaria przewalskii* Maxim. 或梭砂贝母*Fritillaria delavayi* Franch. 的干燥鳞茎。前三者按性状不同分别习称“松贝”和“青贝”，后者习称“炉贝”。

[显微特征]　本品粉末：类白色。

松贝、青贝　淀粉粒甚多，广卵形、长圆形或不规则圆形，有的边缘不平整或略作分枝状，直径5～64μm，脐点短缝状、点状、人字状或马蹄状，层纹隐约可见。表皮细胞类长方形，垂周壁微波状弯曲，偶见不定式气孔，圆形或扁圆形。螺纹导管直径5～26μm。(图1～3)

Powder: Whitish.

Songbei and Qingbei: Starch granules fairly abundant, broadly ovoid, long spheroidal or irregularly spheroidal, some with uneven or slightly branch-like edges, 5～64μm in diameter, hilum short slit-shaped, pointed, V-shaped or U-shaped, and faint striations visible. Epidermal cells subrectangular, anticlinal walls sinuous, rounded or oblate anomocytic stomata occasionally found. Spiral vessels 5～26μm in diameter.（Fig. 1～3）

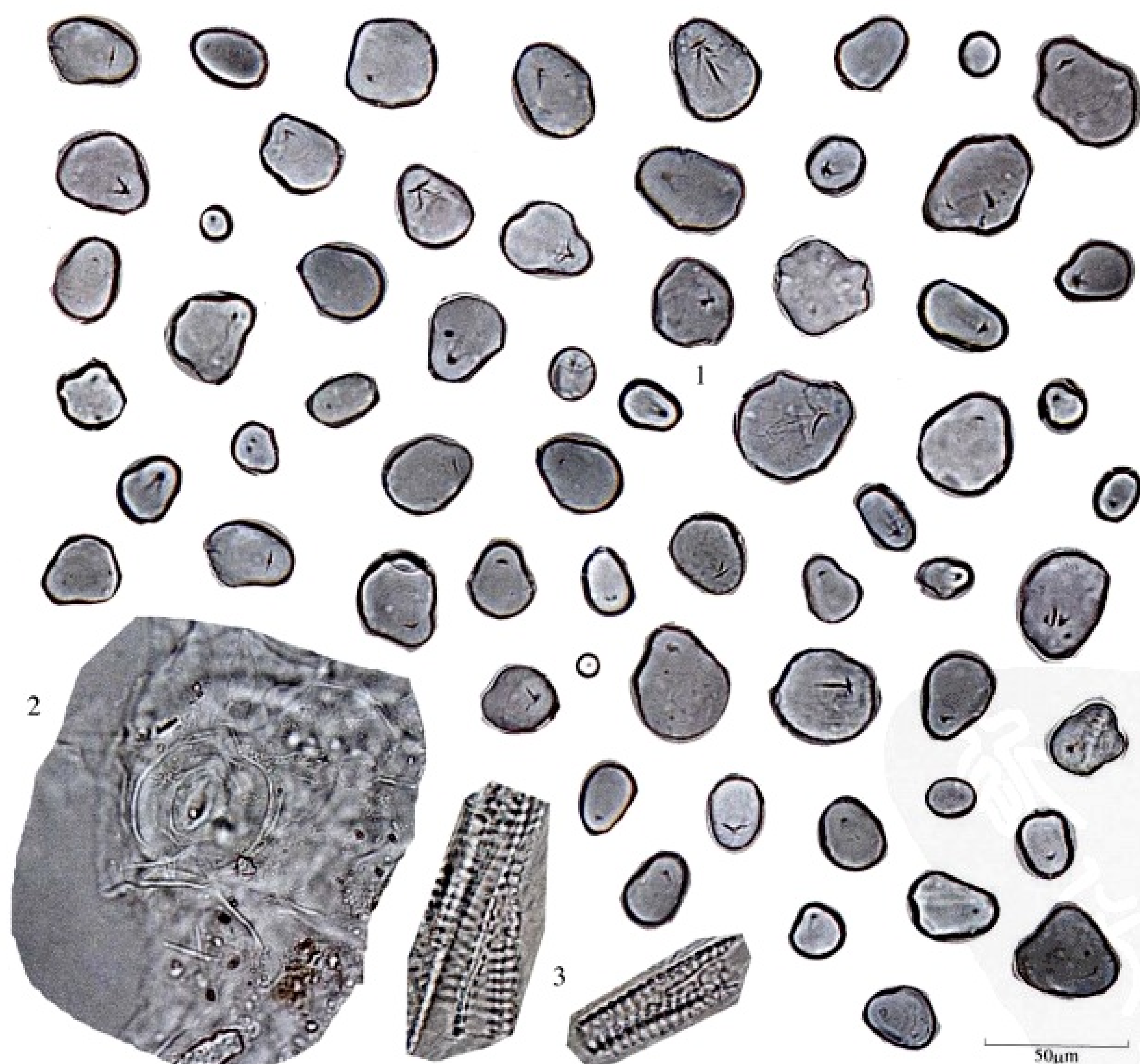


图1　川贝母（*Fritillaria unibracteata* 鳞茎）粉末

[Fig1　Powder of bulb from *Fritillaria unibracteata*]

1. 淀粉粒(Starch granules)　2. 气孔(Stomata)　3. 导管(Vessels)

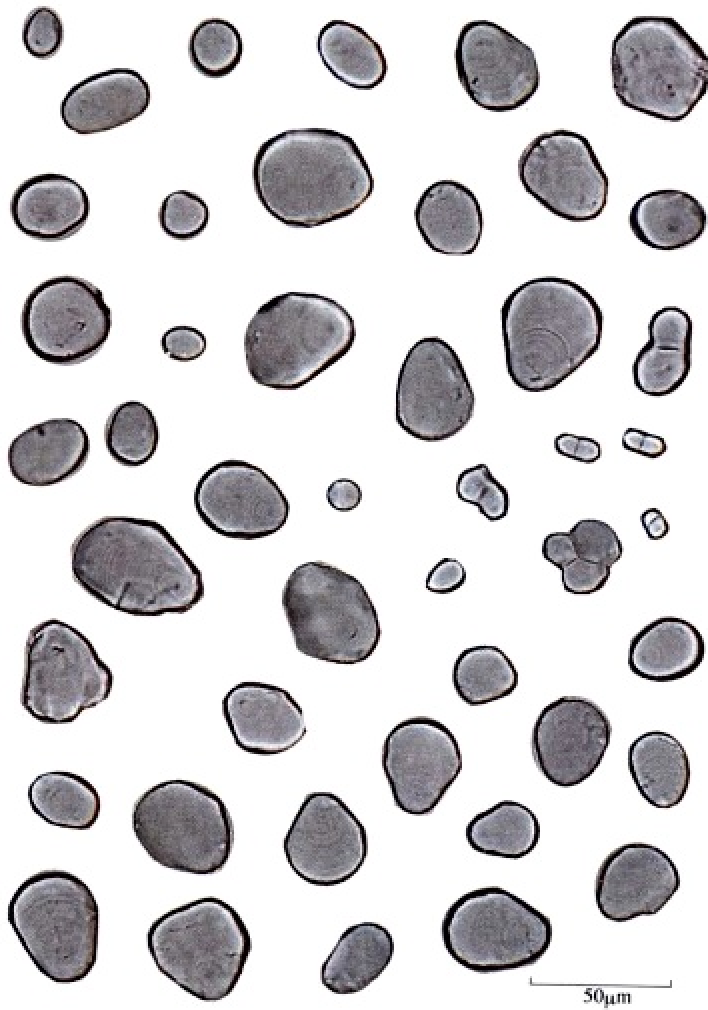


图2 川贝母（*Fritillaria cirrhosa* 鳞茎）粉末
[Fig2 Powder of bulb of *Fritillaria cirrhosa*]

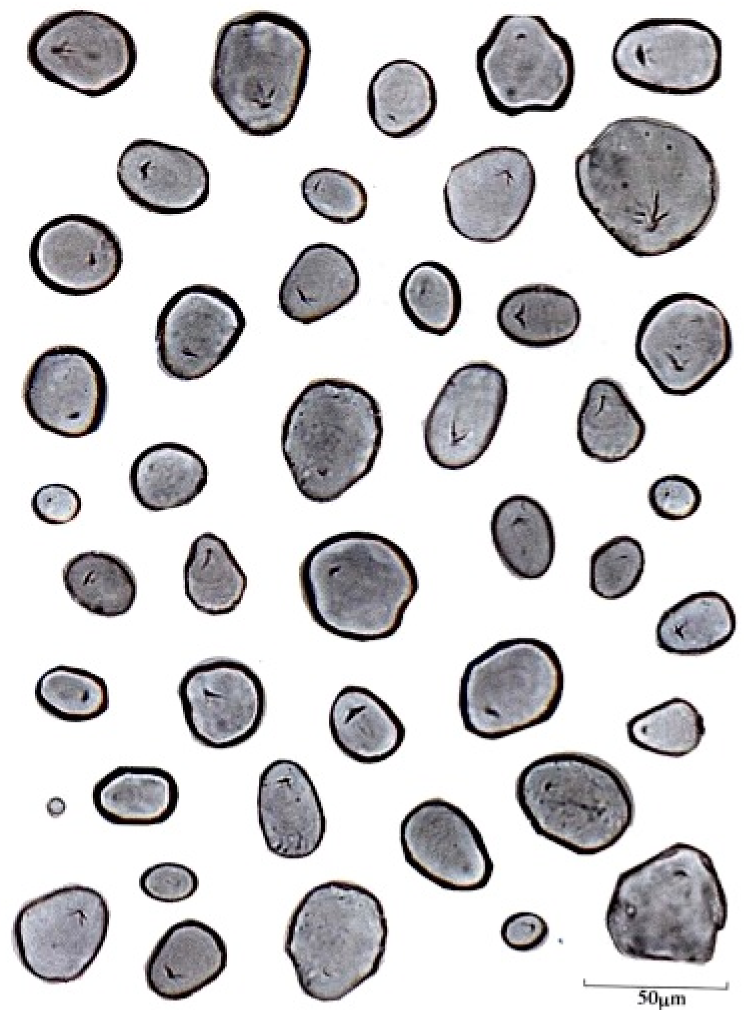


图3 川贝母（*Fritillaria przewalskii* 鳞茎）粉末
[Fig3 Powder of bulb of *Fritillaria przewalskii*]



图4 川贝母（*Fritillaria delavayi* 鳞茎）粉末
[Fig4 Powder of bulb of *Fritillaria delavayi*]

炉贝 淀粉粒广卵形、贝壳形、肾形或椭圆形，直径约至60μm，脐点人字状、星状或点状，层纹明显。螺纹导管及网纹导管直径可达64μm。（图4）

Lubei: Starch granules broad ovoid, conchoidal, reni-form or ellipsoidal, up to 60μm in diameter, hilum V-shaped, stellate or pointed, striations distinct. Spiral and reticulate vessels up to 64μm in diameter. (Fig 4)



川 牛 膝

Chuanniuxi

RADIX CYATHULAE

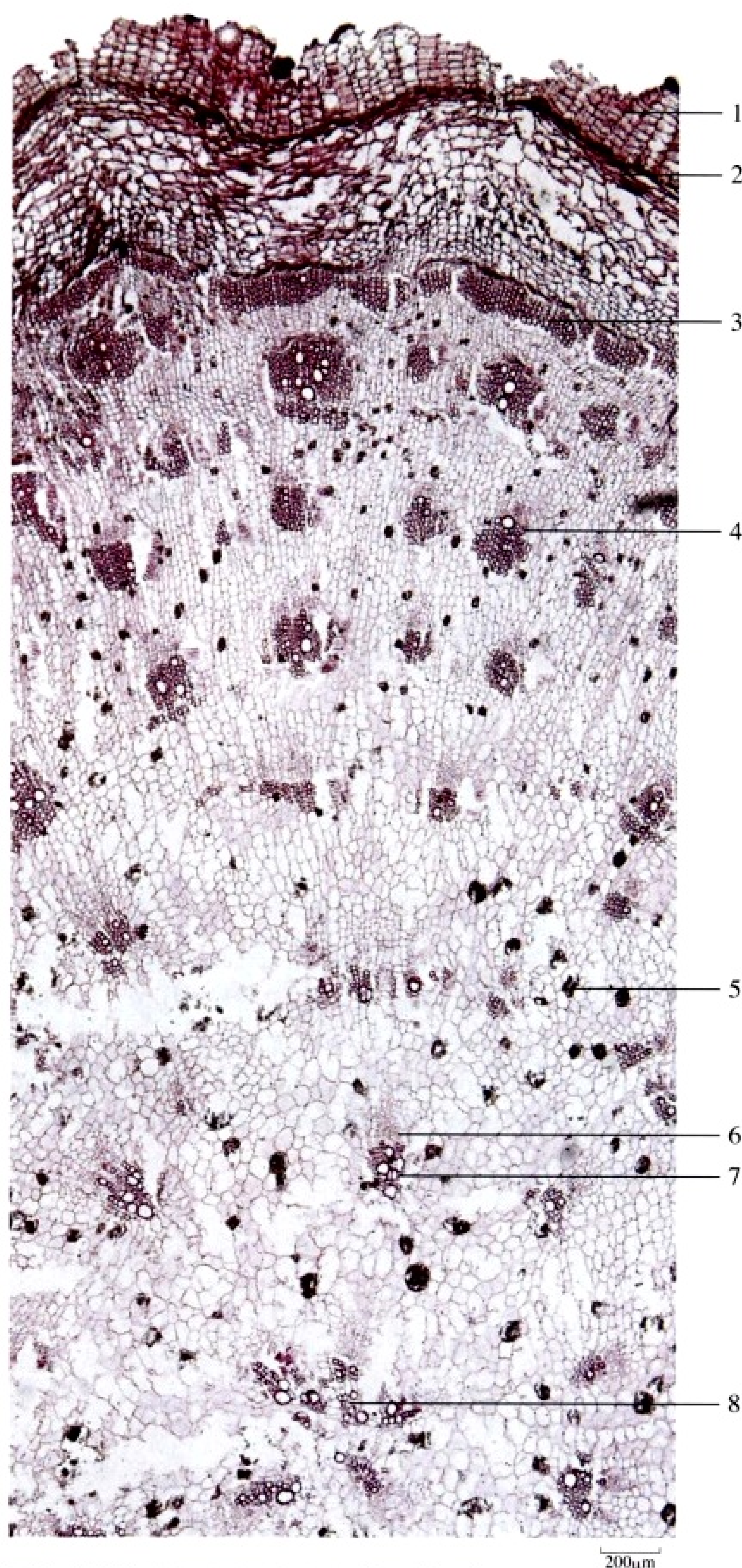


图1 川牛膝（*Cyathula officinalis* 根）横切面

[Fig1 Transverse section of root from *Cyathula officinalis*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 木纤维（Xylary fibres） 4. 三生维管束（Tertiary vascular bundles） 5. 草酸钙结晶（Crystals of calcium oxalate） 6. 韧皮部（Phloem） 7. 木质部（Xylem） 8. 次生维管束（Vascular bundles）

本品为苋科植物川牛膝*Cyathula officinalis* Kuan的干燥根。

[显微特征] 本品横切面：木栓层细胞数列。栓内层窄。中柱大，三生维管束外韧型，断续排列成4～11轮，内侧维管束的束内形成层可见；木质部导管多单个，常径向排列，木化；木纤维较发达，有的切向延伸或断续连接成环。中央次生构造维管系统常分成2～9股，有的根中心可见导管稀疏分布。薄壁细胞含有草酸钙砂晶、方晶。（图1、2）

Transverse section: Cork consisting of several layers of cells. Phelloderm narrow. Vascular cylinder large, tertiary vascular bundles collateral, discontinuously arranged in 4～11 whorls, intrafascicular cambium at the inner side visible; vessels singly scattered in xylem, lignified, arranged radially; xylary fibres relatively developed, sometimes tangentially elongated or arranged in an discontinuously ring. Vascular bundles usually separated into 2～9 strands at the central, sometimes sparsely scattered vessels visible in the centre of root. Parenchymatous cells containing sand crystals and prisms of calcium oxalate. （Fig1,2）

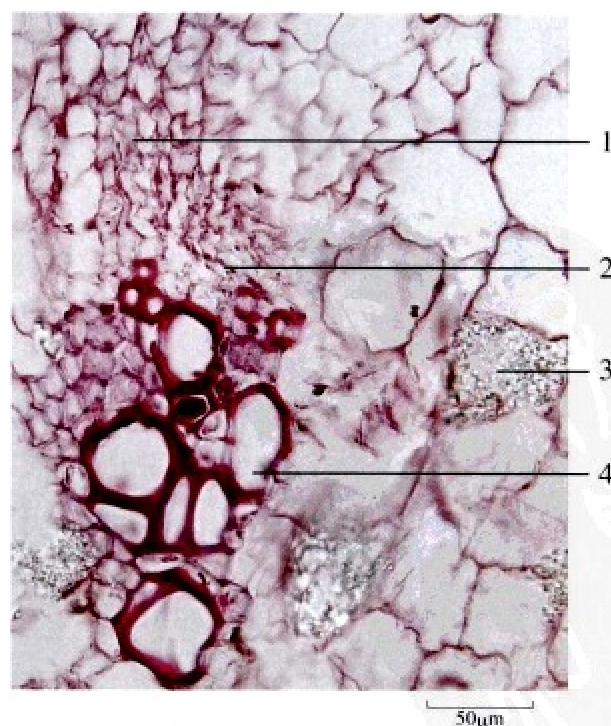


图2 三生维管束放大

[Fig2 Tertiary vascular bundles magnified]

1. 韧皮部（Phloem） 2. 形成层（Cambium） 3. 草酸钙砂晶（Sand crystals of calcium oxalate） 4. 木质部（Xylem）

本品粉末：棕色。草酸钙砂晶、方晶散在，或充塞于薄壁细胞中。具缘纹孔导管直径10～80μm，纹孔圆形或横向延长呈长圆形，互列，排列紧密，有的导管分子末端呈梭形。纤维长条形，弯曲，末端渐尖，直径8～25μm，壁厚3～5μm，纹孔呈单斜纹孔或人字形，也可见具缘纹孔，纹孔口交叉成十字形，孔沟明显，疏密不一。(图3)

Powder: Brown. Sand crystals and prisms of calcium oxalate scattered or filled in parenchymatous cells. Bordered pitted vessels 10 ~ 80μm in diameter, pits rounded or elongated transversely, alternative closely arranged, some vessel elements fusiform at the ends. Fibres slat-shaped, curved, tapering towards the end, 8 ~ 25μm in diameter, walls 3 ~ 5μm thick, pits simple oblique or V-shaped, sometimes showing bordered pits, pit apertures crisscross, pit-canals distinct, dense or sparse.（Fig 3）

图3　川牛膝（*Cyathula officinalis* 根）粉末
[Fig3　Powder of root from *Cyathula officinalis*]
1. 草酸钙结晶（Sand crystals of calcium oxalate）　2. 具缘纹孔导管（Bordered pitted vessels）　3. 纤维（Fibres）

川　乌
Chuanwu
RADIX ACONITI

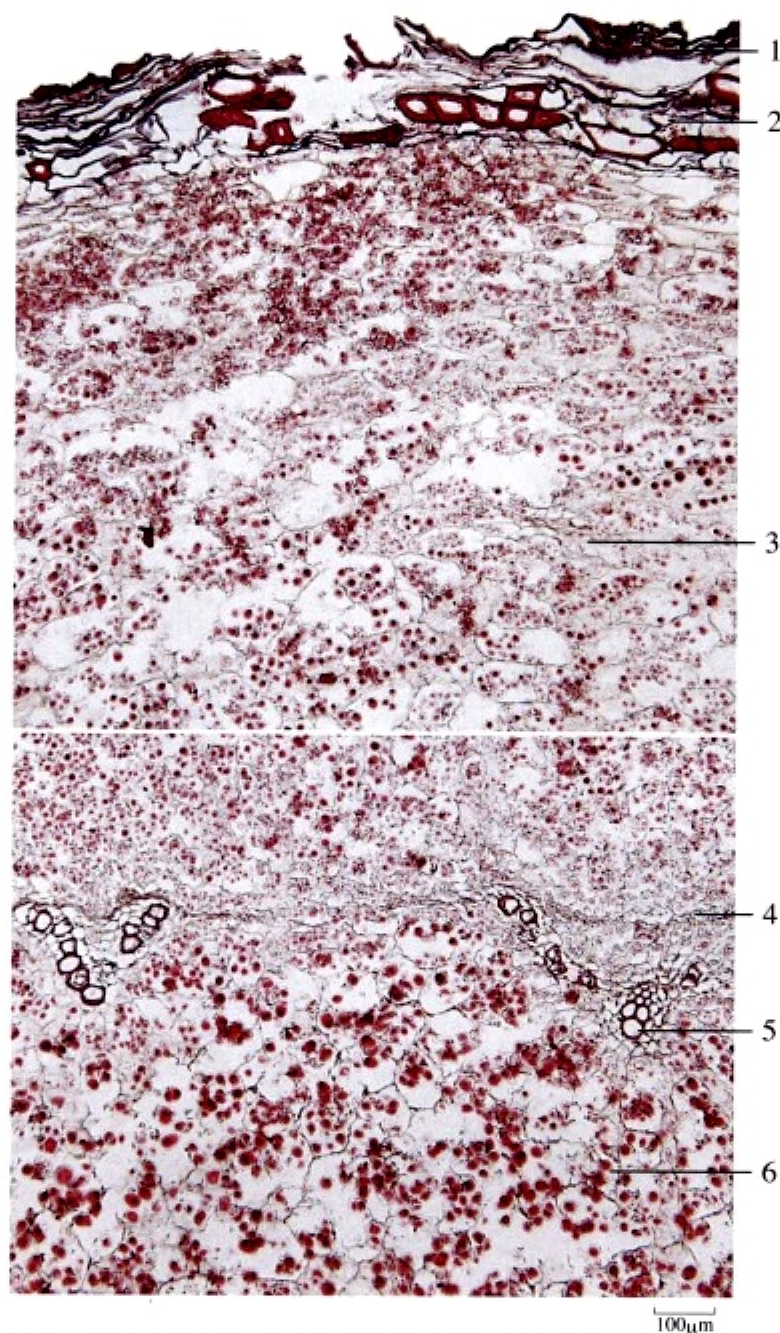


图1　川乌（*Aconitum carmichaeli* 母根）横切面
[Fig1　Transverse section of mother tuber root from *Aconitum carmichaeli*]
1. 后生皮层（Metaderm）　2. 皮层（Cortex）　3. 韧皮部（Phloem）
4. 形成层（Cambium）　5. 木质部（Xylem）　6. 髓（Pith）

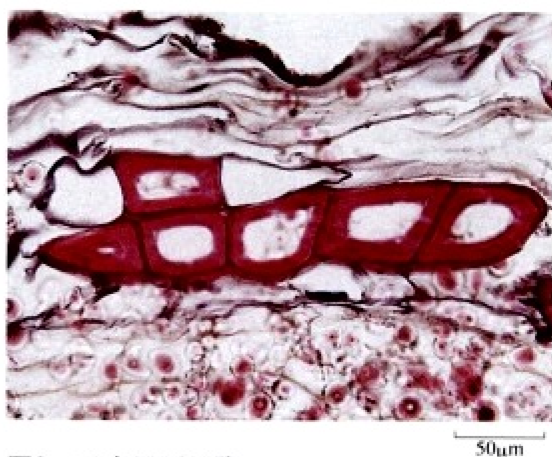


图2　示皮层石细胞
[Fig2　Showing stone cells in cortex]

本品为毛茛科植物乌头*Aconitum carmichaeli* Debx. 的干燥母根。

[显微特征]　本品横切面：后生皮层为棕色木栓化细胞；皮层薄壁组织偶见石细胞，单个散在或数个成群，类长方形、方形或长椭圆形，胞腔较大；内皮层不甚明显。韧皮部散有筛管群；内侧偶见纤维束。形成层类多角形。其内外侧偶有1至数个异型维管束。木质部导管多列，呈径向或略呈"V"形排列。髓部明显。薄壁细胞充满淀粉粒。（图1 ～ 3）

Transverse section: Metaderm consisting of brown suberized cells. Cortical parenchyma scattering stone cells occasionally, singly or in groups, subrectangular, square or long elliptical, with large lumina; endodermis indistinct. Phloem scattering sieve tube groups, fibre bundles occasionally found in the inner part. Cambium ring subpolygonal, one or more abnormal vascular bundles occasionally presented in the inner or outer side. Xylem possessing several rows of vessels, arranged radially or in V-shape. Pith distinct. Parenchymatous cells filled with starch granules.（Fig 1～3）



图3　示木质部
[Fig3　Showing xylem]

本品粉末：灰黄色。淀粉粒单粒球形、长圆形或肾形，直径3～22μm；复粒由2～15分粒组成。石细胞近无色或淡黄绿色，呈类长方形、类方形、多角形或一边斜尖，直径49～117μm，长113～280μm，壁厚4～13μm，壁厚者层纹明显，纹孔较稀疏。后生皮层细胞棕色，有的壁呈瘤状增厚突入细胞腔。导管淡黄色，主为具缘纹孔，直径29～70μm，末端平截或短尖，穿孔位于端壁或侧壁，有的导管分子粗短拐曲或纵横连接。（图4）

Powder: Greyish-yellow. Simple starch granules spheroidal, elongated rounded or reniform, 3 ~ 22μm in diameter; compound granules consisting of 2 ~ 15 components. Stone cells nearly colourless or pale yellowish-green, subrectangular, subsquare, polygonal or oblique at one side, 49 ~ 117μm in diameter, 113 ~ 280μm long, walls 4 ~ 13μm thick, the thick walled stone cells distinctly striated and sparsely pitted. Cells of metaderm brown, some walls unevenly thickened, some appearing tubercular and projecting into lumina. Bordered pitted vessels pale yellow, 29 ~ 70μm in diameter, the ends truncate or acute, perforations at the end walls or side walls, some vessel elements thick and short, tortuous or connected vertically and horizontally. (Fig 4)



图4　川乌（*Aconitum carmichaeli* 母根）粉末

[Fig4　Powder of mother tuber root from *Aconitum carmichaeli*]

1. 淀粉粒（Starch granules）　2. 石细胞（Stone cells）　3. 后生皮层细胞（Metaderm cells）　4. 导管（Vessels）

川　　芎
Chuanxiong
RHIZOMA CHUANXIONG

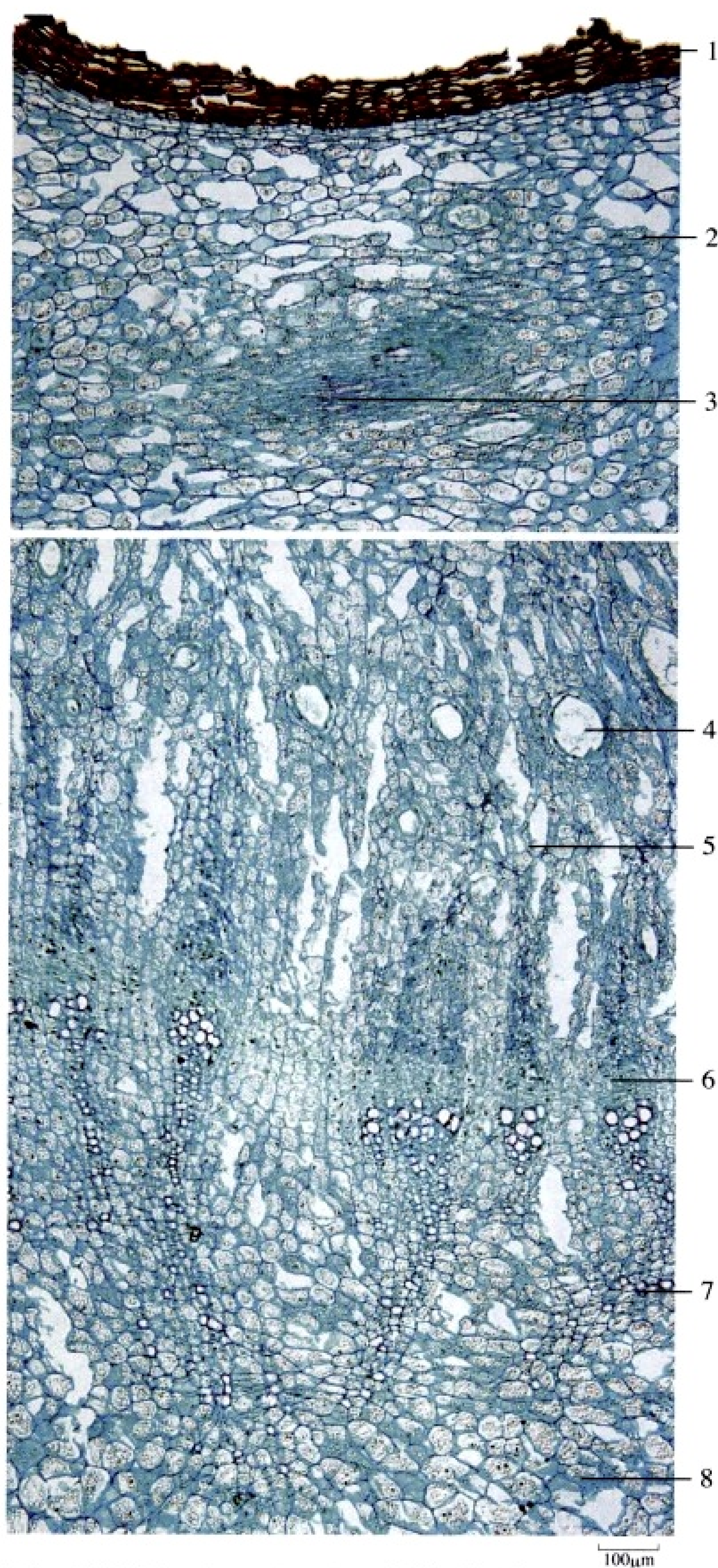


图1　川芎（*Ligusticum chuanxiong* 根茎）横切面

[Fig1　Transverse section of rhizome from *Ligusticum chuanxiong*]

1. 木栓层（Cork）　2. 皮层（Cortex）　3. 根迹维管束（Root trace vascular bundles）　4. 油室（Oil cavities）　5. 韧皮部（Phloem）　6. 形成层（Cambium）　7. 木质部（Xylem）　8. 髓（Pith）

本品为伞形科植物川芎*Ligusticum chuanxiong* Hort. 的干燥根茎。

[显微特征]　本品横切面：木栓层为10余列细胞。皮层较窄，散有根迹维管束，其形成层明显。韧皮部宽广，形成层环波状或不规则多角形。木质部导管多角形或类圆形，大多单列或排成“V”形，偶有木纤维束。髓部较大。薄壁组织中散有多数油室，类圆形、椭圆形或形状不规则，淡黄棕色，靠近形成层的油室小，向外渐大；薄壁细胞中富含淀粉粒，有的薄壁细胞中含草酸钙晶体，呈类圆形团块或类簇晶状。（图1、2）

Transverse section: Cork consisting of 10 or more layers of cells. Cortex narrow, scattered with root trace vascular bundles with distinct cambium. Phloem broad. Cambium ring undulate or irregularly polygonal. Vessels in xylem polygonal or subrounded, mostly uniseriate or arranged in V-shape. Wood fibre bundles occasionally visible. Pith relatively large. Parenchyma scattered with numerous oil cavities, subrounded, elliptical or irregular, pale yellowish-brown, small ones near the cambium and gradually enlarged outwards; parenchymatous cells containing abundant starch granules, some cells with subrounded or clustered crystals of calcium oxalate.（Fig 1, 2）

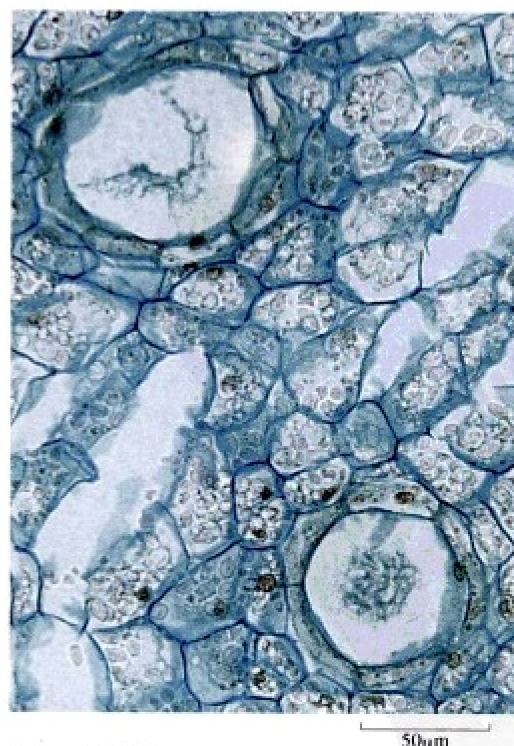


图2　示油室

[Fig2　Showing oil cavity]

本品粉末：淡黄棕色或灰棕色。淀粉粒较多，单粒椭圆形、长圆形、类圆形、卵圆形或肾形，直径5～16μm，长约21μm，脐点点状、长缝状或人字状；偶见复粒，由2～4分粒组成。草酸钙晶体存在于薄壁细胞中，呈类圆形团块或类簇晶状，直径10～25μm。木栓细胞深黄棕色，表面观呈多角形，微波状弯曲。油室多已破碎，偶可见油室碎片，分泌细胞壁薄，含有较多的油滴。导管主为螺纹导管，亦有网纹及梯纹导管，直径14～50μm。（图3）

Powder: Pale yellowish-brown or grayish-brown. Starch granules abundant, single granules ellipsoidal oblong, subspheroidal, ovoid or reniform, 5 ~ 16μm in diameter, about 21μm long, hilum pointed, slit-shaped or V-shaped; compound granules occasionally visible, consisting of 2～4 components. Crystals of calcium oxalate occurring in parenchymatous cells, subrounded or clustered, 10 ~ 25μm in diameter. Cork cells dark yellowish-brown, polygonal in surface view, walls slightly sinuated. Oil cavities mostly broken, fragments occasionally visible, secretory cells thin-walled, containing many oil drops. Vessels mainly spiral, and reticulated or scalariform as well, 14～50μm in diameter. (Fig 3)



图3 川芎（*Ligusticum chuanxiong* 根茎）粉末

[Fig3 Powder of rhizome from *Ligusticum chuanxiong*]

1. 淀粉粒（Starch granules） 2. 草酸钙晶体（Crystals of calcium oxalate） 3. 木栓细胞（Cork cells）
4. 油室碎片（Fragment of oil cavities） 5. 导管（Vessels）

川 射 干

Chuanshegan

RHIZOMA IRIDIS TECTORI

本品为鸢尾科植物鸢尾*Iris tectorum* Maxim. 的干燥根茎。

[显微特征] **本品粉末**：浅黄色。草酸钙柱晶较多，多已破碎，完整者长15～82μm（可达300μm），直径16～52μm。薄壁细胞类圆形或椭圆形，壁稍厚或略呈连珠状，具单纹孔。木栓细胞表面观多角形，壁薄，微波状弯曲，有的具棕色物。（图1）

Powder: Pale yellowish. Prisms of calcium oxalate relatively abundant, mostly broken, the intact ones 15～82μm long (maximum to 300μm), 16～52μm in diameter. Parenchymatous cells subrounded or ellipsoidal, walls slightly thickened or beaded, with simple pits. Cork cells polygonal in surface view, walls thin and slightly sinuous, some containing brown contents. (Fig 1)



图1 川射干（*Iris tectorum* 根茎）粉末

[Fig1 Powder of rhizome from *Iris tectorum*]

1. 草酸钙柱晶（Prisms of calcium oxalate） 2. 薄壁细胞（Parenchymatous cells） 3. 木栓细胞（Cork cells）

川 楝 子

Chuanlianzi

FRUCTUS TOOSENDAN

本品为楝科植物川楝*Melia toosendan* Sieb. et Zucc. 的干燥成熟果实。

[显微特征]　本品粉末：黄棕色。果皮纤维成束，末端钝圆，直径9～36μm，壁极厚，周围的薄壁细胞中含草酸钙方晶，形成晶纤维。果皮石细胞呈类圆形、不规则长条形或长多角形，有的有瘤状突起或钝圆短分枝，直径14～54μm，长约至150μm。种皮细胞鲜黄色或橙黄色，表皮下为一列类方形细胞，直径约至44μm，壁极厚，有纵向微波状纹理，其下连接色素层。表皮细胞表面观多角形，有较密颗粒状纹理。种皮色素层细胞胞腔内充满红棕色物。种皮含晶细胞直径13～27μm，壁厚薄不一，厚者形成石细胞，胞腔内充满淡黄色、黄棕色或红棕色物，并含细小草酸钙方晶，直径约5μm。草酸钙簇晶直径5～27μm。(图1)

Powder: Yellowish-brown. Pericarp fibre in bundles, 9 ~ 36μm in diameter, the end obtused, walls thickened, surrounded with parenchymatous cells containing prisms of calcium oxalate, forming crystal fibres. Pericarp stone cells subrounded, unevenly elongated or polygonal, 14 ~ 54μm in diameter, 150μm long with warty protruding or short obtuse branches. Testa cells fresh yellow or yellowish-orange, with 1 layer of subsquare cells under epidermis, 44μm in diameter, walls thickened, with longitudinal lightly sinuous striation, connecting to pigment layer. Epidermal cell polygonal in surface view, with granular striation. Lumina of pigment layer cells of testa containing reddish-brown substances. Testa contains crystal cells, 13 ~ 27μm in diameter, lumina contain lightly yellow, yellowish-brown or reddish-brown substances, and containing minute prisms of calcium oxalate, 5μm in diameter. Calcium oxalate crystals 5 ~ 27μm in diameter. (Fig 1)

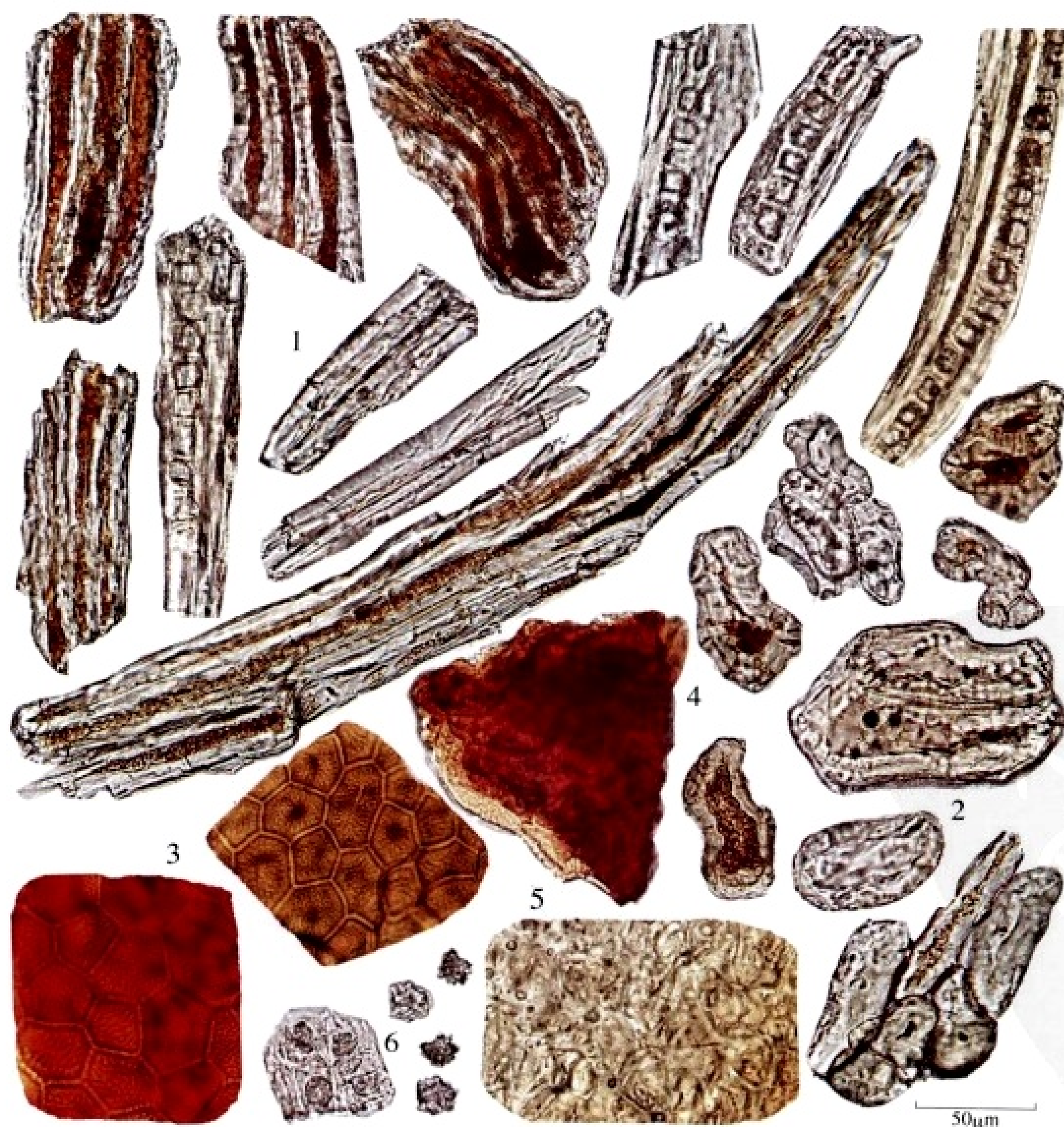


图1　川楝子（*Melia toosendan* 果实）粉末

[Fig1　Powder of fruit from *Melia toosendan*]

1. 果皮纤维及晶纤维（Pericarp fibres and crystal fibres）　2. 果皮石细胞（Pericarp stone cells）　3. 种皮表皮细胞（Epidermal cells of testa）　4. 种皮色素层（Pigment layer of testa）　5. 种皮含晶细胞（Testa cells containing crystal）　6. 草酸钙簇晶（Clusters of calcium oxalate）

广　　枣

Guangzao

FRUCTUS CHOEROSPONDIATIS

本品系蒙古族习用药材。为漆树科植物南酸枣*Choerospondias axillaris*（Roxb.） Burtt et Hill的干燥成熟果实。

[显微特征]　**本品粉末**：棕色。内果皮石细胞呈类圆形、椭圆形、梭形、长方形或不规则形，有的延长呈纤维状或有分枝，直径14～72μm，长25～294μm，壁厚，孔沟明显，胞腔内含淡黄棕色或黄褐色物。内果皮纤维木化，多上下层纵横交错排列，壁厚或稍厚，有的胞腔内含黄棕色物。外果皮细胞表面观呈类多角形，胞腔内含棕色物；断面观细胞呈类长方形，径向延长，外壁及径向壁角质化增厚。中果皮薄壁细胞含草酸钙簇晶和少数方晶，簇晶直径17～42μm，方晶菱形或不规则形，长10～48μm，直径7～27μm。（图1）

Powder: Brown. Stone cells of endocarp subrounded, elliptical, fusiform, rectangular or irregular, some elongated to fibre-like or branched, 14 ~ 72μm in diameter, 25 ~ 294μm long, with thickened walls and distinct pit canals, lumina containing pale yellowish-brown contents. Fibers of endocarp lignified, with thickened or slightly thickened walls, crisscross arranged, and sometimes lumina containing yellowish-brown contents. Cells of exocarp subpolygonal in surface view, containing brown contents, and subrectangular in lateral view, radially elongated, the outer and radial walls cutinized-thickened. Parenchymatous cells of mesocarp containing clusters and a few prisms of calcium oxalate, the clusters 17～42μm in diameter, prisms rhomboid or irregular, 10～48μm long, 7～27μm in diameter.（Fig 1）



图1　广枣（*Choerospondias axillaris* 果实）粉末

[Fig1　Powder of fruit from *Choerospondias axillaris*]

1. 内果皮石细胞（Stone cells of endocarp）　2. 内果皮纤维（Fibres of endocarp）　3. 外果皮细胞[Cells of exocarp（a. 表面观Surface view b. 断面观Lateral view）]　4. 中果皮薄壁细胞含草酸钙簇晶（Parenchymatous cells of mesocarp, containing clusters of calcium oxalate）

广 藿 香

Guanghuoxiang

HERBA POGOSTEMONIS

本品为唇形科植物广藿香*Pogostemon cablin* （Blanco） Benth. 的干燥地上部分。

[显微特征] **本品叶片粉末**：淡棕色。叶表皮细胞呈不规则形，气孔直轴式。非腺毛1～6细胞，平直或先端弯曲，长约至590μm，壁具疣状突起，有的胞腔含黄棕色物。腺鳞头部8细胞，直径37～70μm；柄单细胞，极短。间隙腺毛存在于叶肉组织细胞间隙中，头部单细胞，呈不规则囊状，直径13～50μm，长约至113μm；柄短，单细胞。小腺毛头部2细胞；柄1～3细胞，甚短。草酸钙针晶细小，散在于叶肉细胞中，长约至27μm。（图1）

Powder of leaf: Pale brown. Epidermal cells irregular, stomata diacytic. Non-glandular hairs 1 to 6 celled, straight or curved at the apex, up to 590μm long, walls warty, some cells containing yellowish-brown masses. Glandular scales each with an 8 celled head, 37～70μm in diameter, and with a very short unicellular stalk. Intercellular glandular hairs occurring in the intercellular spaces of mesophyll tissue, each with an unicellular head, irregularly saccular, 13～50μm in diameter, up to about 113μm long, and with a short unicellular stalk. Small glandular hairs each with a bicellular head and a very short 1～3-celled stalk. Needle crystals of calcium oxalate minute, scattered in mesophyll cells, up to about 27μm long.（Fig 1）



图1 广藿香（*Pogostemon cablin* 叶片）粉末

[Fig1 Powder of leaf from *Pogostemon cablin*]

1. 表皮细胞（Epidermal cells） 2. 非腺毛（Non-glandular hairs） 3. 腺鳞（Glandular scales） 4. 间隙腺毛（Intercellular glandular hairs） 5. 小腺毛（Small glandular hairs） 6. 草酸钙针晶（Needles of calcium oxalate）

小　茴　香
Xiaohuixiang
FRUCTUS FOENICULI

本品为伞形科植物茴香*Foeniculum vulgare* Mill.的干燥成熟果实。

[显微特征]　**本品分果横切面**：外果皮为1列扁平细胞，外被角质层。中果皮纵棱处有维管束，其周围有多数木化网纹细胞；背面纵棱间各有大的椭圆形棕色油管1个，接合面有油管2个，共6个。内果皮为1列扁平薄壁细胞，细胞长短不一。种皮细胞扁长，含棕色物。胚乳细胞多角形，含多数糊粉粒，每个糊粉粒中含有细小草酸钙簇晶。(图1、2)

Transverse section of mericarp: Exocarp consisting of 1 layer of flattened cells, covered cuticle at outside. Mesocarp with 5 ribs each containing a vascular bundle surrounded by numerous lignified reticulate cells. Vittae 6, large, elliptical and brown, 4 of them situated in the dorsal between every 2 ribs and 2 in the commissural. Endocarp consisting of 1 layer of flattened thin-walled cells varying in length. The testa cells compressed and elongated, containing brown contents. Endosperm cells polygonal, filled with aleurone grains, each embedding a minute cluster of calcium oxalate. (Fig 1, 2)

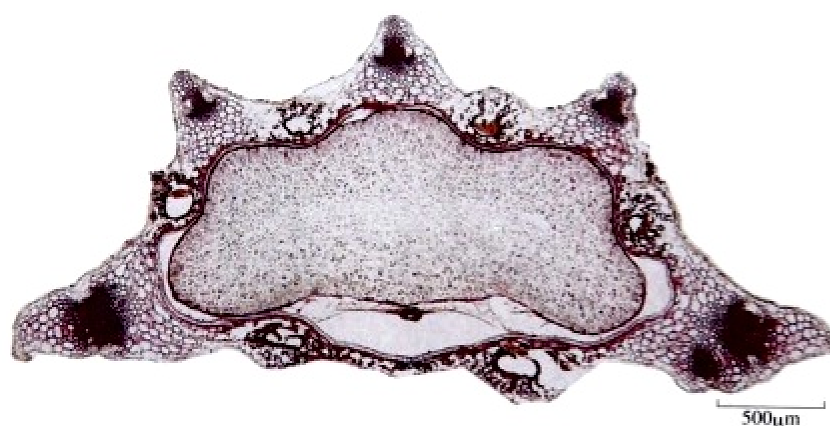


图1　小茴香（*Foeniculum vulgare* 果实）横切图

[Fig1　Transverse section of fruit from *Foeniculum vulgare*]

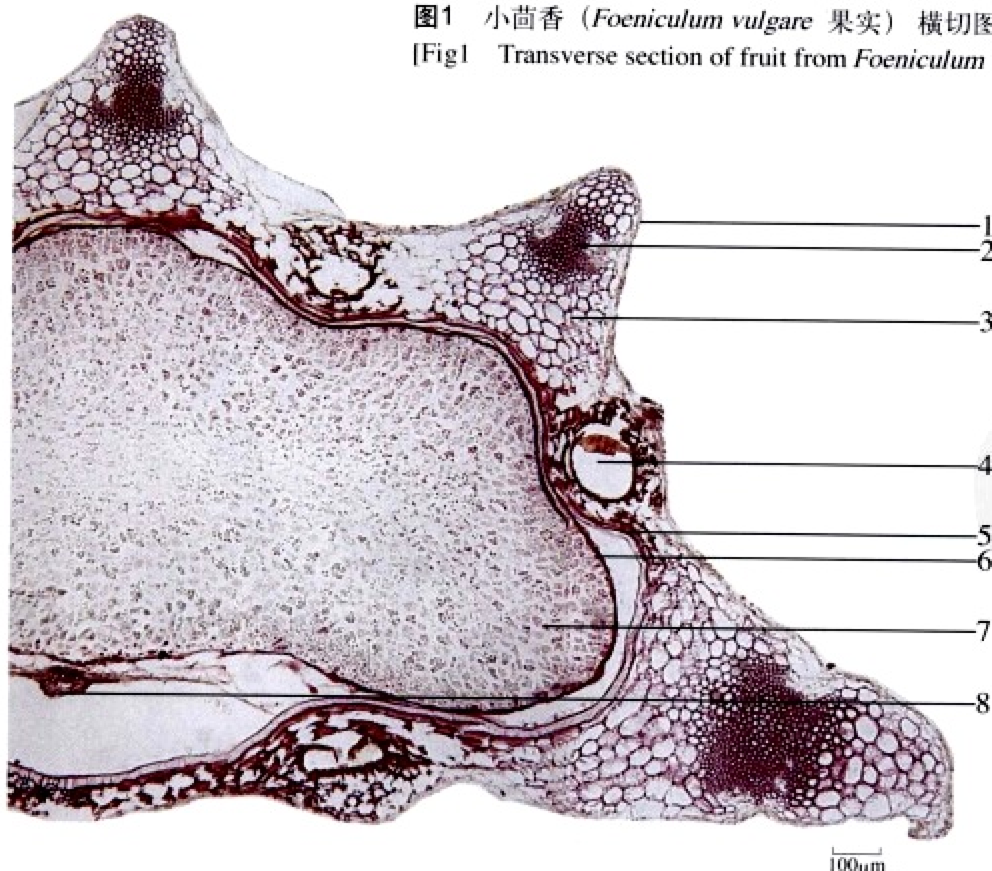


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 外果皮（Exocarp）　2. 维管束（Vascular bundle）　3. 中果皮（Mesocarp）　4. 油管（Vitta）　5. 内果皮（Endocarp）　6. 种皮（Testa）　7. 胚乳（Endosperm）　8. 种脊维管束（Rhaphe vascular bundle）

小　通　草

Xiaotongcao

MEDULLA STACHYURI
MEDULLA HELWINGIAE

本品为旌节花科植物喜马山旌节花*Stachyurus himalaicus* Hook. f. et Thoms.、中国旌节花*Stachyurus chinensis* Franch. 或山茱萸科植物青荚叶*Helwingia japonica* (Thunb.) Dietr. 的干燥茎髓。

[显微特征]　本品横切面：旌节花　均为薄壁细胞，类圆形、椭圆形或多角形，纹孔稀疏；有黏液细胞散在。中国旌节花有少数草酸钙簇晶，喜马山旌节花无簇晶。(图1)

Transverse section: *Stachyurus chinensis* and *Stachyurus himalaicus:* All composed of rounded, elliptical or polygonal parenchymatous cells, sparsely pitted, with mucilage cells scattered. *Stachyurus chinensis* showing a few of clusters of calcium oxalate, and *Stachyurus himalaicus* showing no clusters. (Fig 1)



图1　小通草（*Stachyurus himalaicus* 茎髓） 横切面
[Fig1　Transverse section of stem pith from *Stachyurus himalaicus*]

青荚叶　薄壁细胞纹孔较明显，含无色液滴，有少数草酸钙簇晶，无黏液细胞。(图2)

Helwingia japonica: Parenchymatous cells with relatively distinct pits, containing colourless liquid drops and a few of clusters of calcium oxalate; mucilage cells absent. (Fig 2)

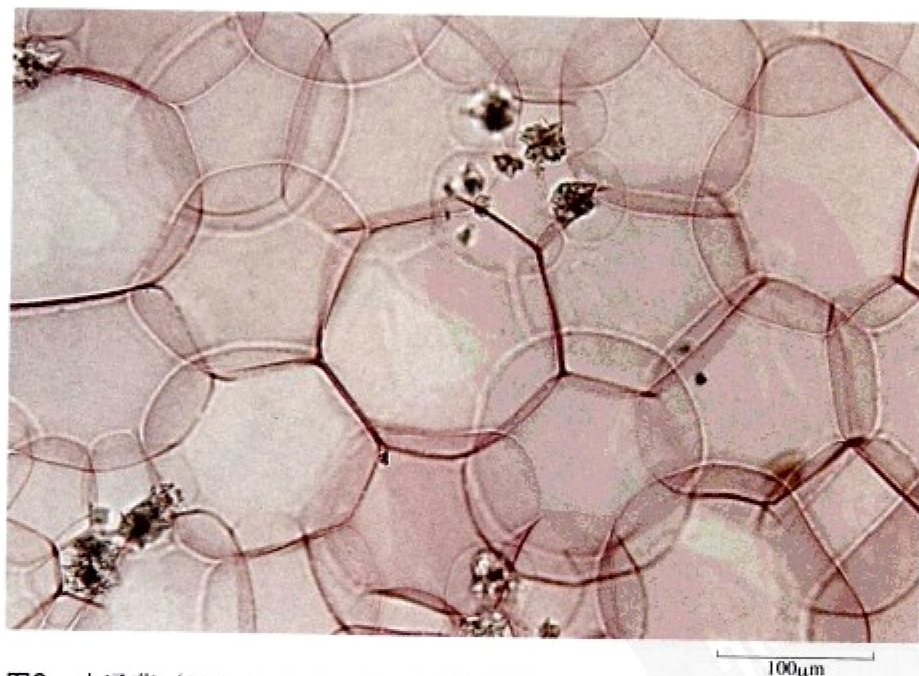


图2　小通草（*Helwingia japonica* 茎髓） 横切面
[Fig2　Transverse section of stem pith from *Helwingia japonica*]

小　　蓟

Xiaoji

HERBA CIRSII

本品为菊科植物刺儿菜*Cirsium setosum*（Willd.） MB. 的干燥地上部分。

[显微特征]　**本品叶的表面观：**上表皮细胞多角形，垂周壁平直，表面角质纹理明显；下表皮细胞垂周壁波状弯曲；上下表皮均有气孔及非腺毛。气孔不定式或不等式。非腺毛3～10余细胞，顶端细胞细长呈鞭状，皱缩扭曲。叶肉细胞中含草酸钙结晶，多呈针簇状。(图1)

Surface view of leaf: The upper epidermal cells polygonal, with straight anticlinal walls and markedly striated cuticle; the lower epidermal cells with sinuous walls; stomata and non-glandular hairs occurring on both surfaces. Stomata anomocytic or anisocytic. Non-glandular hairs 3～10 or more celled, with a slender whip-shaped apical cell, shrunken and twisted. Mesophyll cells containing crystals of calcium oxalate, mostly in needle clusters. (Fig 1)

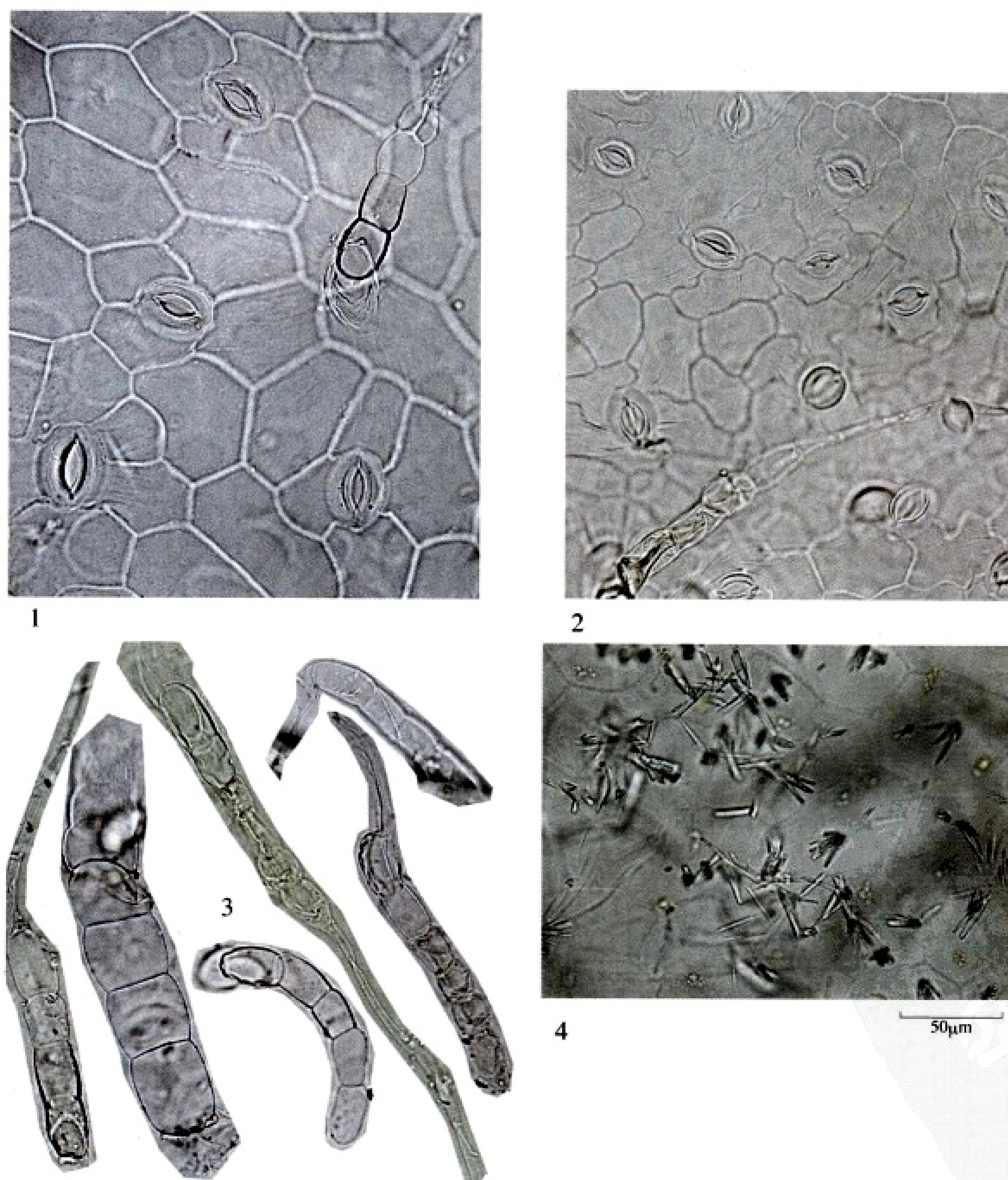


图1　小蓟（*Cirsium setosum* 叶）　表面观

[Fig1　Surface view of leaf from *Cirsium setosum*]

1. 上表皮细胞 (Upper epidermal cells)　2. 下表皮细胞 (Lower epidermal cells)　3. 非腺毛 (Non-glandular hairs)　4. 叶肉细胞含草酸钙结晶 (Mesophyll cells containing crystals of calcium oxalate)

马 勃

Mabo

LASIOSPHAERA SEU CALVATIA

本品为灰包科真菌脱皮马勃*Lasiosphaera fenzlii* Reich.、大马勃*Calvatia gigantea*（Batsch ex Pers.）Lloyd 或紫色马勃*Calvatia lilacina*（Mont. et Berk.）Lloyd的干燥子实体。

[显微特征] 脱皮马勃粉末：灰褐色。孢丝长，淡褐色，有分枝，相互交织，直径2～4.5μm，壁厚。孢子褐色，球形，直径4.5～5μm，有小刺，长1.5～3μm。（图1）

Powder of sporophore of *Lasiosphaera fenzlii:* Greyish-brown. Capillitium long, brownish and branched, interlaced each other, 2～4.5μm in diameter, thick-walled. Spores brown, globoid, 4.5～5μm in diameter, with minute spines, 1.5～3μm long. (Fig 1)



图1 马勃（*Lasiosphaera fenzlii* 子实体）粉末

[Fig1 Powder of sporophore from *Lasiopharea fenzlii*]

1. 菌丝（Capillitium） 2. 孢子（Spores）

大马勃粉末：淡青褐色。孢丝稍分枝，有稀少横隔，直径2.5 ～ 6μm。孢子淡青黄色，光滑或有的具微细疣点，直径3.5 ～ 5μm。（图2）

Powder of sporophore of *Calvatia gigantea:* Pale bluish-brown. Capillitium slightly branched, rarely septated, 2.5～6μm in diameter. Spores pale bluish-yellow, smooth or some finely warted, 3.5～5μm in diameter. (Fig 2)



图2 马勃（*Calvatia gigantea* 子实体）粉末
[Fig2 Powder of sporophore from *Calvatia gigantea*]
1. 菌丝（Capillitium） 2. 孢子（Spores）

紫色马勃粉末：灰紫色。孢丝分枝，有横隔，直径2～5μm，壁厚。孢子紫色，直径4～5.5μm，有小刺。（图3）

Powder of sporophore of *Calvatia lilacina:* Greyish-purple. Capillitium branched and septated, 2～5μm in diameter, thick-walled. Spores 4～5.5μm in diameter with minute spines. (Fig 3)



图3 马勃（*Calvatia lilacina* 子实体）粉末
[Fig3 Powder of sporophore from *Calvatia lilacina*]
1. 菌丝（Capillitium） 2. 孢子（Spores）

马 钱 子

Maqianzi

SEMEN STRYCHNI

本品为马钱科植物马钱*Strychnos nux-vomica* L. 的干燥成熟种子。

[显微特征] **本品粉末**：灰黄色。非腺毛单细胞，基部膨大似石细胞，壁极厚，多碎断，木化。胚乳细胞多角形，壁厚，内含脂肪油及糊粉粒。（图1）

Powder: Greyish-yellow. Non-glandular hairs unicellular, mostly broken, with very thickened and lignified walls, enlarged at base like a stone cell. Endosperm cells polygonal, thick walled, containing fatty oil and aleurone grains. (Fig 1)

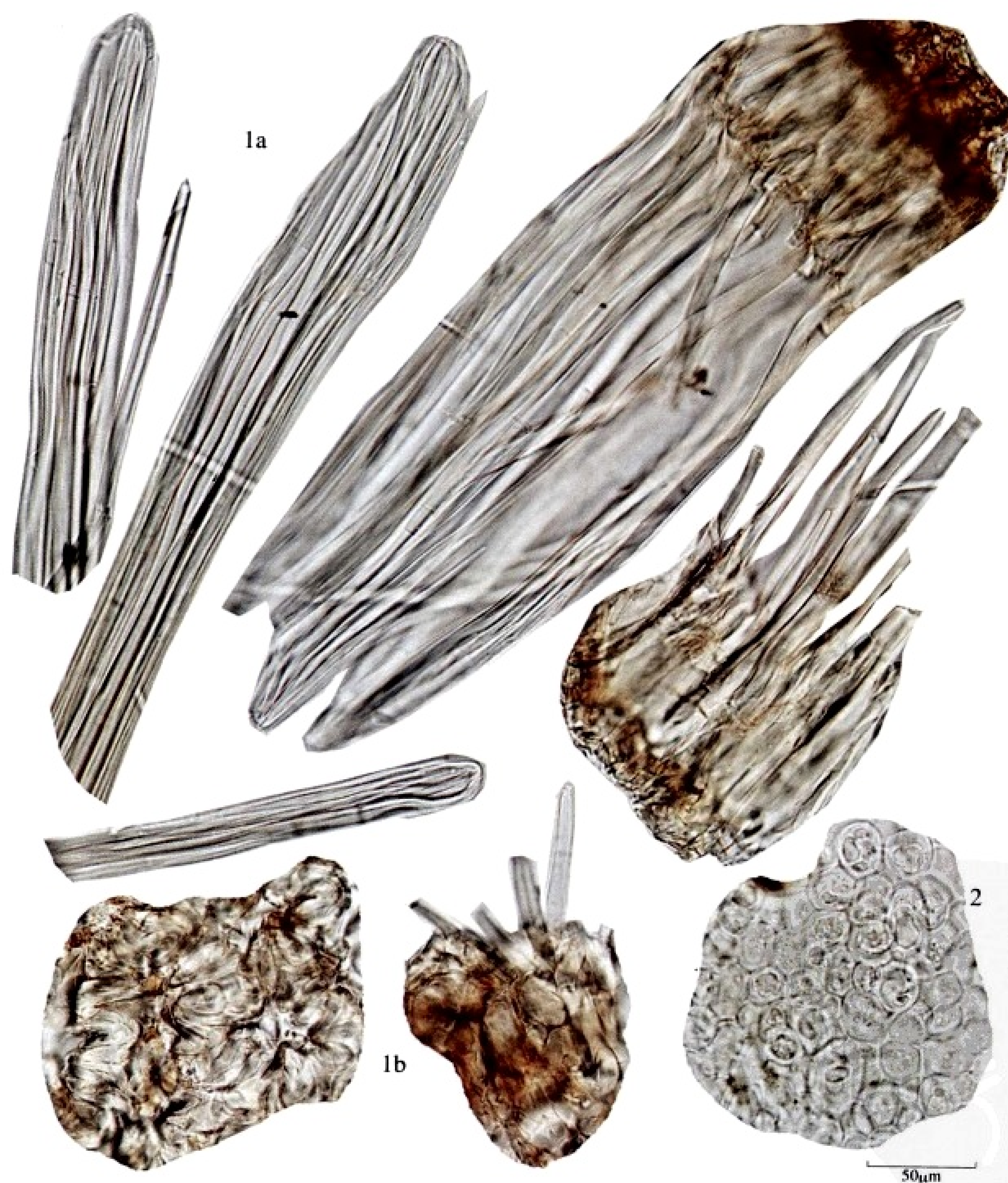


图1 马钱子（*Strychnos nux-vomica* 种子）粉末

[Fig1 Powder of seed from *Strychnos nux-vomica*]

1. 非腺毛Non-glandular hairs（a. 上部Upper part b. 基部Basal part） 2. 胚乳细胞（Endosperm cells）

马 鞭 草

Mabiancao

HERBA VERBENAE

本品为马鞭草科植物马鞭草*Verbena officinalis* L. 的干燥地上部分。

[显微特征] **本品粉末**：绿褐色。茎表皮细胞呈长多角形或类长方形，垂周壁多平直，具气孔。叶下表皮细胞垂周壁波状弯曲，气孔不定式或不等式，副卫细胞3～5个。腺鳞头部4细胞，直径23～58μm；柄单细胞。非腺毛单细胞。花粉粒类圆形或类圆三角形，直径24～35μm，表面光滑，有3个萌发孔。(图1)

Powder: Greenish-brown. Epidermal cells of stem long polygonal or subrectangular, anticlinal walls mostly straight, stomata visible. The lower epidermal cells of leaf with sinuous anticlinal walls, stomata anomocytic or anisocytic, subsidiary cells 3～5. Glandular scales each with a 4-celled head, 23～58μm in diameter, and an unicellular stalk. Non-glandular hairs unicellular. Pollen grains subrounded or subrounded triangular, 24～35μm in diameter, exine smooth, with 3 germinal apertures. (Fig 1)



图1 马鞭草（*Verbena officinalis* 地上部分）粉末

[Fig1 Powder of aerial part from *Verbena officinalis*]

1. 茎表皮细胞(Epidermal cells of stem) 2. 叶下表皮细胞(Lower epidermal cells of leaf) 3. 腺鳞(Glandular scales) 4. 非腺毛(Non-glandular hairs) 5. 花粉粒(Pollen grains)

王不留行
Wangbuliuxing
SEMEN VACCARIAE

本品为石竹科植物麦蓝菜*Vaccaria segetalis*（Neck.）Garcke的干燥成熟种子。

[显微特征] **本品粉末**：淡灰褐色。种皮表皮细胞红棕色或黄棕色，表面观多角形或长多角形，直径50～120μm，垂周壁增厚，星角状或深波状弯曲。种皮内表皮细胞淡黄棕色，表面观类方形、类长方形或多角形，垂周壁呈紧密的连珠状增厚，表面可见网状增厚纹理。胚乳细胞多角形、类方形或类长方形，胞腔内充满淀粉粒及糊粉粒。子叶细胞含有脂肪油滴。（图1）

Powder: Pale greyish-brown. Epidermal cells of testa reddish-brown or yellowish-brown, polygonal or elongated polygonal in surface view, 50～120μm in diameter, anticlinal walls thickened, stellate or sinuate. Inner epidermis cells of testa pale yellowish-brown, subsquare, subrectangular or polygonal in surface view, anticlinal walls densely beaded, reticulated striations visible on surface. Endosperm cells polygonal, subsquare or subrectangular, lumina filled with starch granules and aleurone grains. Cotyledon cells containing fatty oil droplets.（Fig 1）



图1 王不留行（*Vaccaria segetalis* 种子）粉末

[Fig1 Powder of seed from *Vaccaria segetalis*]

1. 种皮表皮细胞[Epidermal cells of testa（a.表面观Surface view b.断面观Lateral view）] 2. 种皮内表皮细胞（Inner epidermal cells of testa） 3. 胚乳细胞（Endosperm cells） 4.子叶细胞（Cotyledon cells）

天山雪莲
Tianshanxuelian
HERBA SAUSSUREAE INVOLUCRATAE

本品系维吾尔族习用药材。为菊科植物天山雪莲*Saussurea involucrate*（Kar. et Kir.） Sch. Bip. 的干燥地上部分。

[显微特征] **本品粉末**：黄灰色至黄绿色。腺毛类棒槌形，头部和柄多为2列细胞。非腺毛为多细胞或单细胞，基部细胞类长方形，先端细胞较细或扭曲，长40～300μm。花粉粒球形，直径45～68μm，外壁有刺状突起，具3孔沟。气孔不定式。冠毛为多列分枝状毛。花柱碎片具刺状或绒毛状突起。（图1）

Powder: Yellowish-grey to yellowish-green. Glandular hairs pestle-like, heads and stalks mostly 2-celled. Non-glandular hairs frequently polycellular or unicellular, basal cells subrectanglar, apical cells relatively slender or twisted, 40 ~ 300μm long. Pollens spherical, 45 ~ 68μm in diameter, with thorny exine and 3 furrows. Stomata anomocytic. Pappi branched, in several rows. Fragments of stigma with thorny or villiform protuberances.（Fig 1）



图1 天山雪莲（*Saussurea involucrate* 地上部分）粉末

[Fig1 Powder of aerial part from *Saussurea involucrate*]

1. 腺毛（Glandular hairs） 2. 非腺毛（Non-glandular hairs） 3. 花粉粒（Pollens） 4. 气孔（Stomata） 5. 冠毛（Pappi） 6. 花柱碎片（Fragments of stigma）

天　仙　藤

Tianxianteng

HERBA ARISTOLOCHIAE

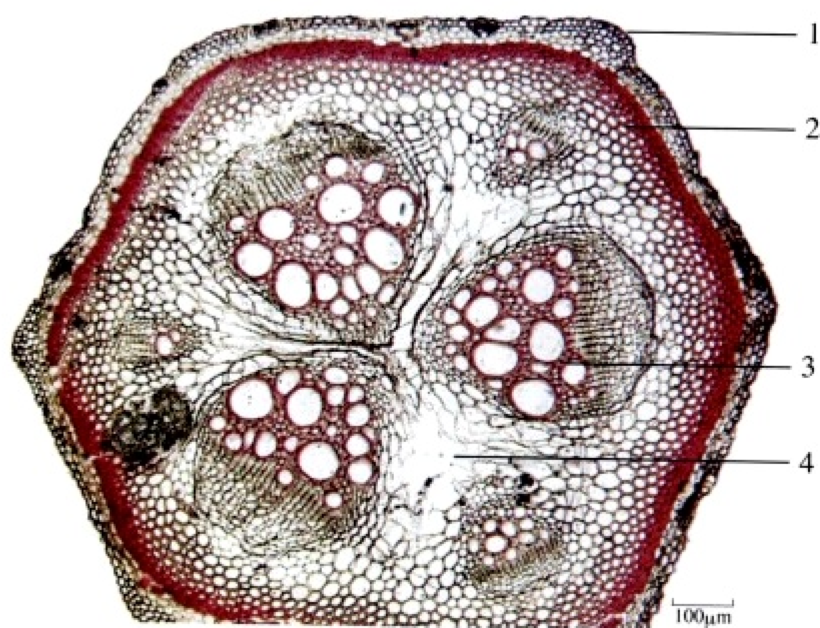


图1　天仙藤（*Aristolochia debilis* 一年生茎）横切面

[Fig1　Transverse section of annual stem from *Aristolochia debilis*]

1. 表皮（Epidermis）　2. 中柱鞘纤维（Pericyclic fibres）　3. 维管束（Vascular bundle）　4. 髓（Pith）

本品为马兜铃科植物马兜铃*Aristolochia debilis* Sieb. et Zucc.或北马兜铃*Aristolochia contorta* Bge.的干燥地上部分。

[显微特征]　本品茎横切面：表皮细胞类方形，外被角质层。皮层较窄。中柱鞘纤维6～10余层，连接成环带，外侧的纤维壁厚，向内侧逐渐变薄。维管束数个，大小不等。形成层成环。导管类圆形，直径10～170μm。有髓。（图1、2）

Transverse section of stem: Epidermal cells subsquare, covered with cuticle. Cortex relatively narrow. Pericyclic fibres with 6～10 and more layers, connecting in rings, walls thickened outside and thinned gradually towards the inner part. Several vascular bundles in variable size. Cambium in a ring. Vessels subrounded, 10～170 μm in diameter. Pith visible. （Fig 1, 2）

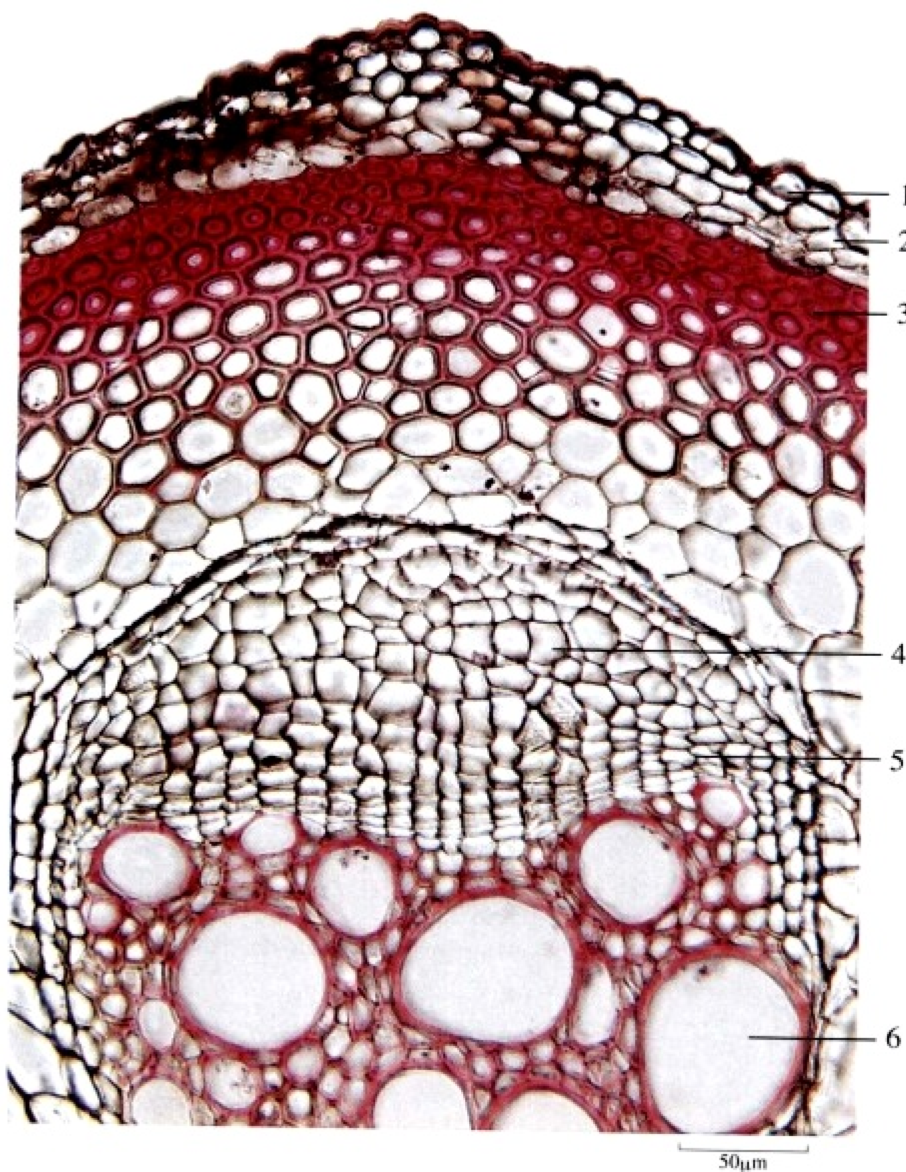


图2　局部组织放大

[Fig2　Partial tissue magnificed]

1. 表皮（Epidermis）　2. 皮层（Cortex）　3. 中柱鞘纤维（Pericyclic fibres）　4. 韧皮部（Phloem）　5. 形成层（Cambium）　6. 木质部导管（Xylem vessels）

天　冬

Tiandong

RADIX ASPARAGI

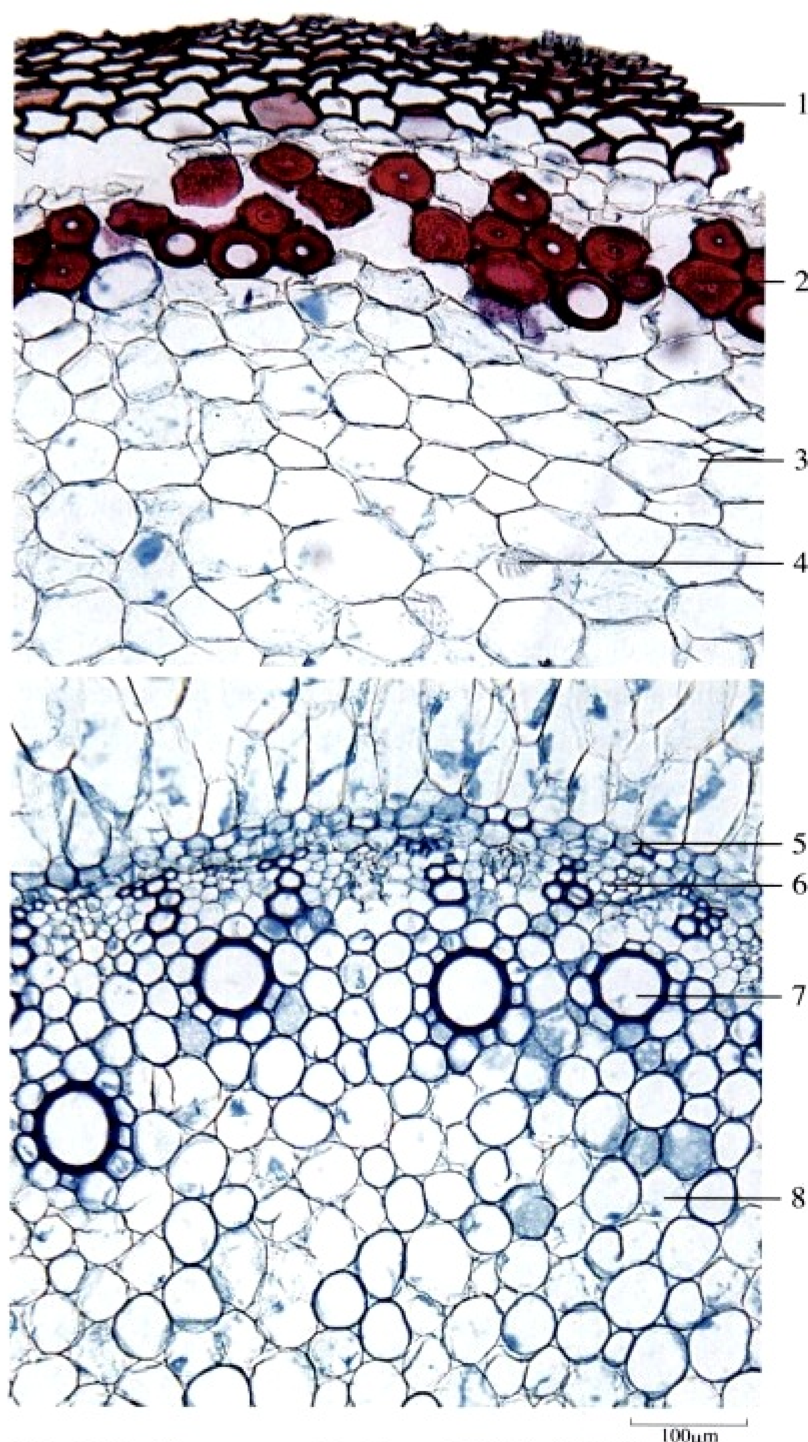


图1　天冬（*Asparagus cochinchinensis* 块根）横切面

[Fig1　Transverse section of tuber root from *Asparagus cochinchinensis*]

1. 根被（Velamen）　2. 石细胞（Stone cells）　3. 皮层（Cortex）　4. 草酸钙针晶束（Raphides of calcium oxalate）　5. 内皮层（Endodermis）　6. 韧皮部束（Phloem bundles）　7. 木质部导管（Xylem vessels）　8. 髓（Pith）

本品为百合科植物天冬*Asparagus cochinchinensis*（Lour.）Merr. 的干燥块根。

[显微特征]　本品横切面：根被有时残存。皮层宽广，外侧有石细胞散在或断续排列成环，石细胞浅黄棕色，长条形、长椭圆形或类圆形，直径32～110μm，壁厚，纹孔及孔沟极细密；黏液细胞散在，草酸钙针晶束存在于椭圆形黏液细胞中，针晶长40～99μm。内皮层明显。中柱韧皮部束和木质部束各31～135个，相互间隔排列，少数导管深入至髓部，髓细胞亦含草酸钙针晶束。（图1、2）

Transverse section: Remaining velamen sometimes visible. Cortex broad, with stone cells on the outer part, scattered or arranged in an interrupted ring, stone cells pale yellowish-brown, elongated-rectangular, long-elliptical or subrounded, 32～110μm in diameter, walls thickened, with very fine and dense pits and pit-canals; mucilage cells scattered, raphides of calcium oxalate occurring in elliptical mucilage cells, 40～99μm long. Endodermis distinct. Phloem strands and xylem strands 31～135, respectively, arranged alternatively, a few vessels developing towards the pith. Pith cells also contain raphides of calcium oxalate. (Fig 1, 2)



图2　示草酸钙针晶束

[Fig2　Showing raphides of calcium oxalate]

天 花 粉

Tianhuafen

RADIX TRICHOSANTHIS

本品为葫芦科植物栝楼*Trichosanthes kirilowii* Maxim. 或双边栝楼*Trichosanthes rosthornii* Harms的干燥根。

[显微特征]　本品粉末：类白色。淀粉粒甚多，单粒类球形、半圆形或盔帽形，直径6～48μm，脐点点状、短缝状或人字状，层纹隐约可见；复粒由2～14分粒组成，常由一个大的分粒与几个小分粒复合。具缘纹孔导管大，多破碎，有的具缘纹孔呈六角形或方形，排列紧密。石细胞黄绿色，长方形、椭圆形、类方形、多角形或纺锤形，直径27～72μm，壁较厚，纹孔细密。（图1）

Powder: Whitish. Starch granules numerous, simple granules subspheroid, semicircular or helmeted, 6～48μm in diameter, hilum pointed, shortly cleft or V-shaped, striations faintly visible; compound granules consisting of 2～14 components, frequently composed of one big component and several small ones. Bordered pitted vessels large, mostly broken, some bordered pits hexagonal or square, closely arranged. Stone cells yellowish-green, rectangular, elliptical, subsquare, polygonal or fusiform, 27～72μm in diameter, relatively thick walled and densely fine pitted.（Fig 1）



图1　天花粉（*Trichosanthes kirilowii* 根）粉末

[Fig1　Powder of root from *Trichosanthes kirilowii*]

1. 淀粉粒（Starch granules）　2. 导管（Vessels）　3. 石细胞（Stone cells）

天　南　星

Tiannanxing

RHIZOMA ARISAEMATIS

本品为天南星科植物天南星 *Arisaema erubescens*（Wall.）Schott、异叶天南星*Arisaema heterophyllum* Bl. 或东北天南星 *Arisaema amurense* Maxim. 的干燥块茎。

［显微特征］　**本品粉末**：类白色。淀粉粒以单粒为主，圆球形或长圆形，直径2～17μm，脐点点状、裂缝状，大粒层纹隐约可见；复粒少数，由2～12分粒组成。草酸钙针晶散在或成束存在于黏液细胞中，长63～131μm。草酸钙方晶多见于导管旁的薄壁细胞中，直径3～20μm。（图1）

Powder: Whitish. Starch granules mostly simple, spherical or oblong, 2～17μm in diameter, hilum pointed or slit-shaped, large granules with faint striations; a few compound granules consisting of 2～12 components. Raphides of calcium oxalate scattered or in bundles occuring in mucilage cells, 63～131μm long. Prisms of calcium oxalate mostly occuring parenchymatous cells beside vessels, 3～20μm in diameter. (Fig 1)

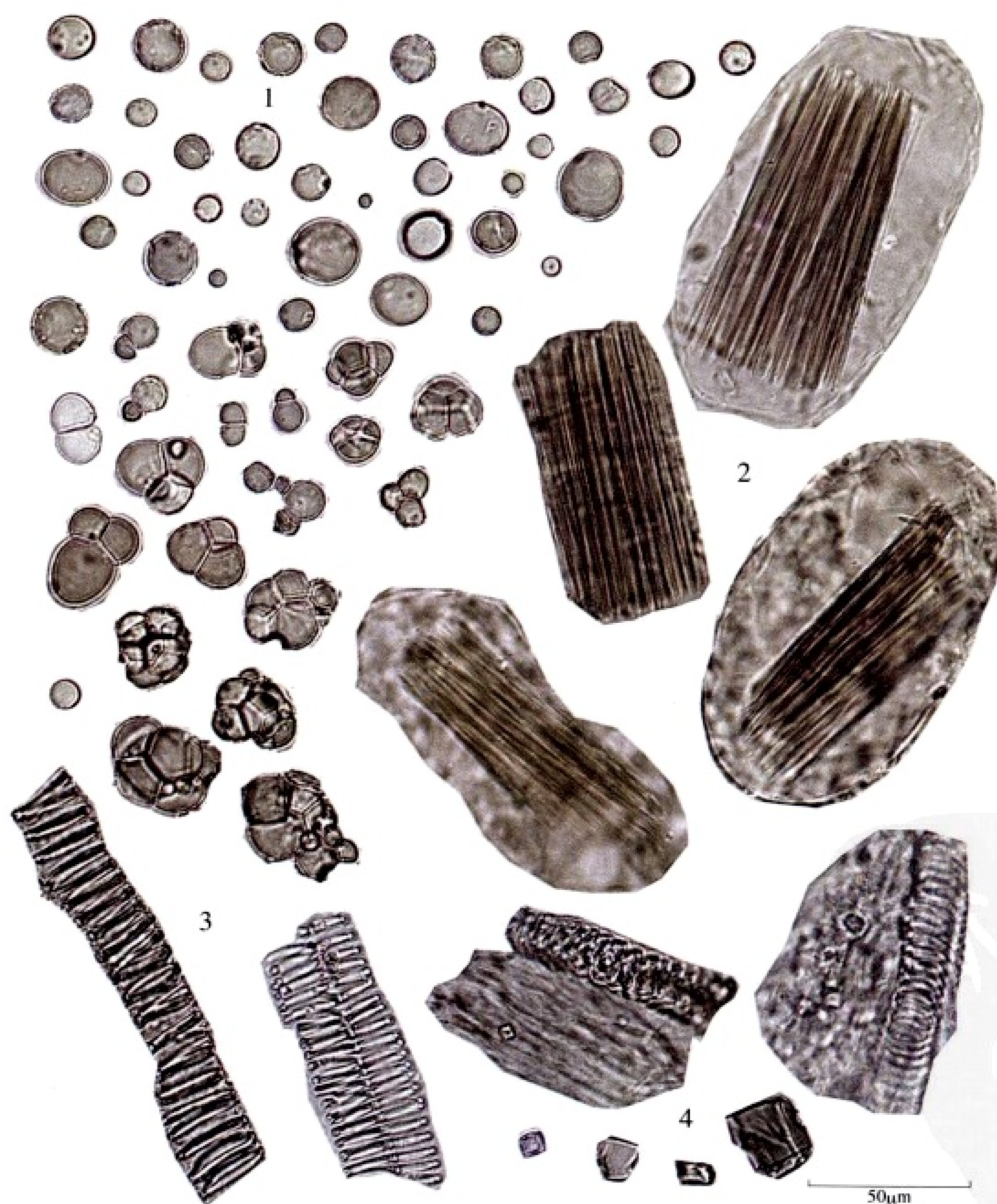


图1　天南星（*Arisaema erubescens* 块茎）粉末

[Fig1　Powder of tuber rhizome from *Arisaema erubescens*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶（Raphides of calcium oxalate）　3. 导管（Vessels）　4. 草酸钙方晶（Prisms of calcium oxalate）

天　　麻

Tianma

RHIZOMA GASTRODIAE

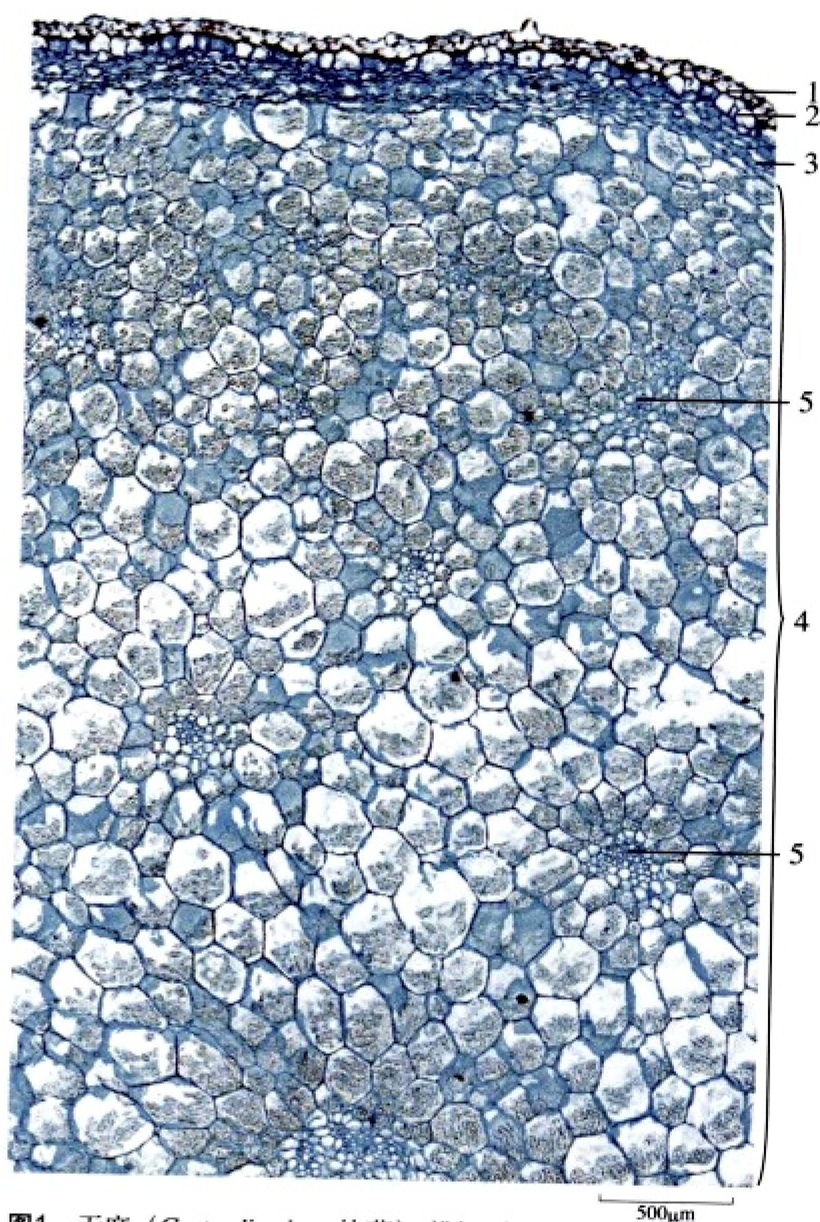


图1　天麻（*Gastrodia elata* 块茎）横切面

[Fig1　Transverse section of tuber rhizome from *Gastrodia elata*]

1. 表皮（Epidermis）　2. 下皮（Hypodermis）　3. 皮层（Cortex）　4. 中柱（Stele）　5. 维管束（Vascular bundles）

本品为兰科植物天麻 *Gastrodia elata* Bl. 的干燥块茎。

[显微特征]　本品横切面：表皮有残留，下皮由2～3列切向延长的栓化细胞组成。皮层为10数列多角形细胞，有的含草酸钙针晶束。较老块茎皮层与下皮相接处有2～3列椭圆形厚壁细胞，木化，纹孔明显。中柱占绝大部分，有小型周韧维管束散在；薄壁细胞亦含草酸钙针晶束。（图1～3）

Transverse section: Remains of epidermis visible, hypodermis consisting of 2～3 rows of suberized and tangentially elongated cells. Cortex consisting of over 10 rows of polygonal cells, some containing raphides of calcium oxalate. In aged, tubers 2～3 rows of elliptical sclerenchymatous cells present in cortex adjacent to hypodermis, with lignified and obviously pitted walls. Stele occupied the most part of rhizome, scattered with small amphicribral vascular bundles, parenchymatous cells containing raphides of calcium oxalate.（Fig 1～3）

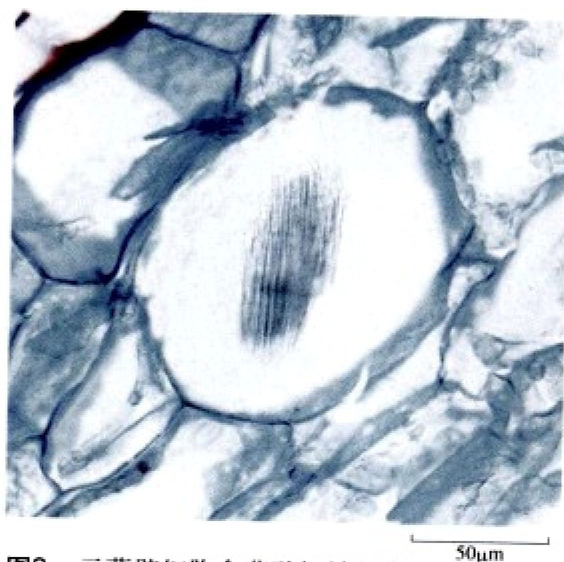


图2　示薄壁细胞含草酸钙针晶束

[Fig2　Showing parenchymatous cells containing raphides of calcium oxalate]

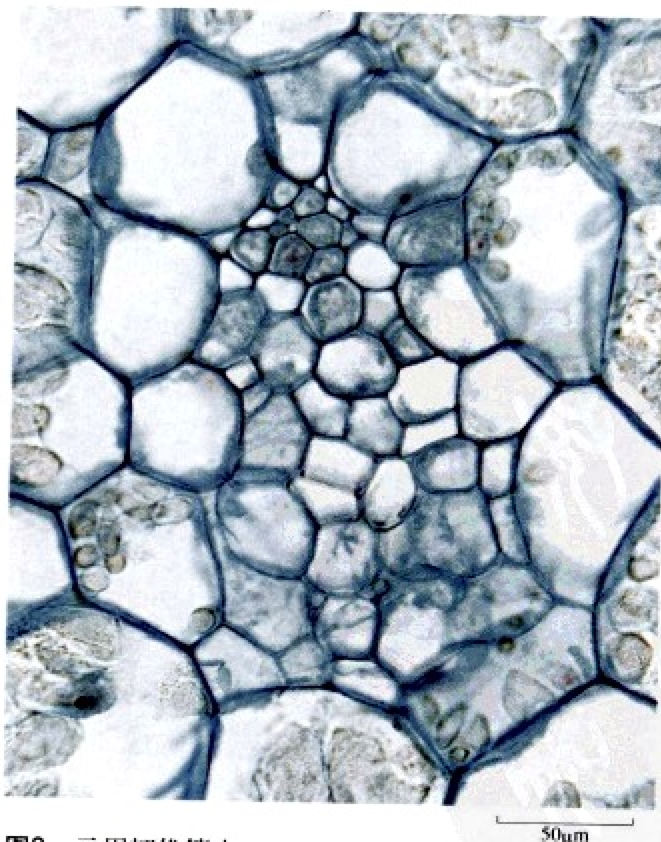


图3　示周韧维管束

[Fig3　Showing amphicribral vascular bundles]

本品粉末：黄白色至黄棕色。厚壁细胞椭圆形或类多角形，直径70～180μm，壁厚3～8μm，木化，纹孔明显。草酸钙针晶成束或散在，长25～75（93）μm。用醋酸甘油水装片观察含糊化多糖类物的薄壁细胞无色，有的细胞可见长卵形、长椭圆形或类圆形颗粒，遇碘液显棕色或淡棕紫色。螺纹导管、网纹导管及环纹导管直径8～30μm。（图4）

Powder: Yellowish-white to yellowish-brown. Sclerenchymatous cells elliptical or subpolygonal, 70～180μm in diameter, walls 3～8μm in thickness, lignified, distinctly pitted. Needle crystals of calcium oxalate in bundles or scattered, 25～75（93）μm long. When mounted in Smith's starch reagent, parenchymatous cells containing gelatinized polysaccharides colourless, and some cells containing long-ovoid, long-ellipsoid or subrounded granules, showing a brown or brownish-purple colour on adding iodine solution. Spiral, reticulated and annual vessels 8～30μm in diameter.（Fig 4）

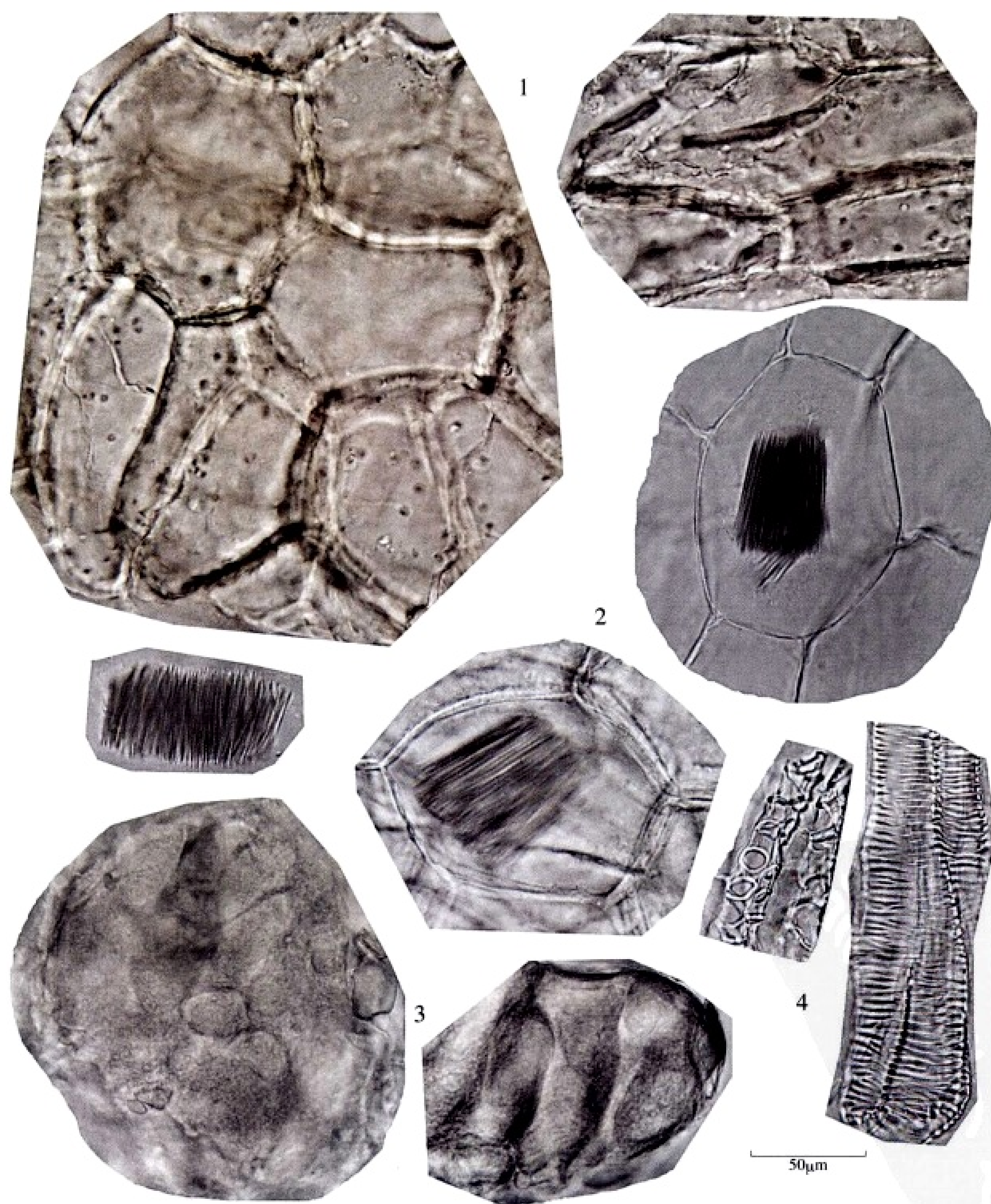


图4 天麻（*Gastrodia elata* 块茎）粉末

[Fig4 Powder of tuber rhizome from *Gastrodia elata*]

1. 厚壁细胞（Sclerenchymatous cells） 2. 草酸钙针晶束（Raphides of calcium oxalate） 3. 含糊化多糖类物的薄壁细胞（Parenchymatous cells containing gelatinized polysaccharides） 4. 导管（Vessels）

天 葵 子

Tiankuizi

RADIX SEMIAQUILEGIAE

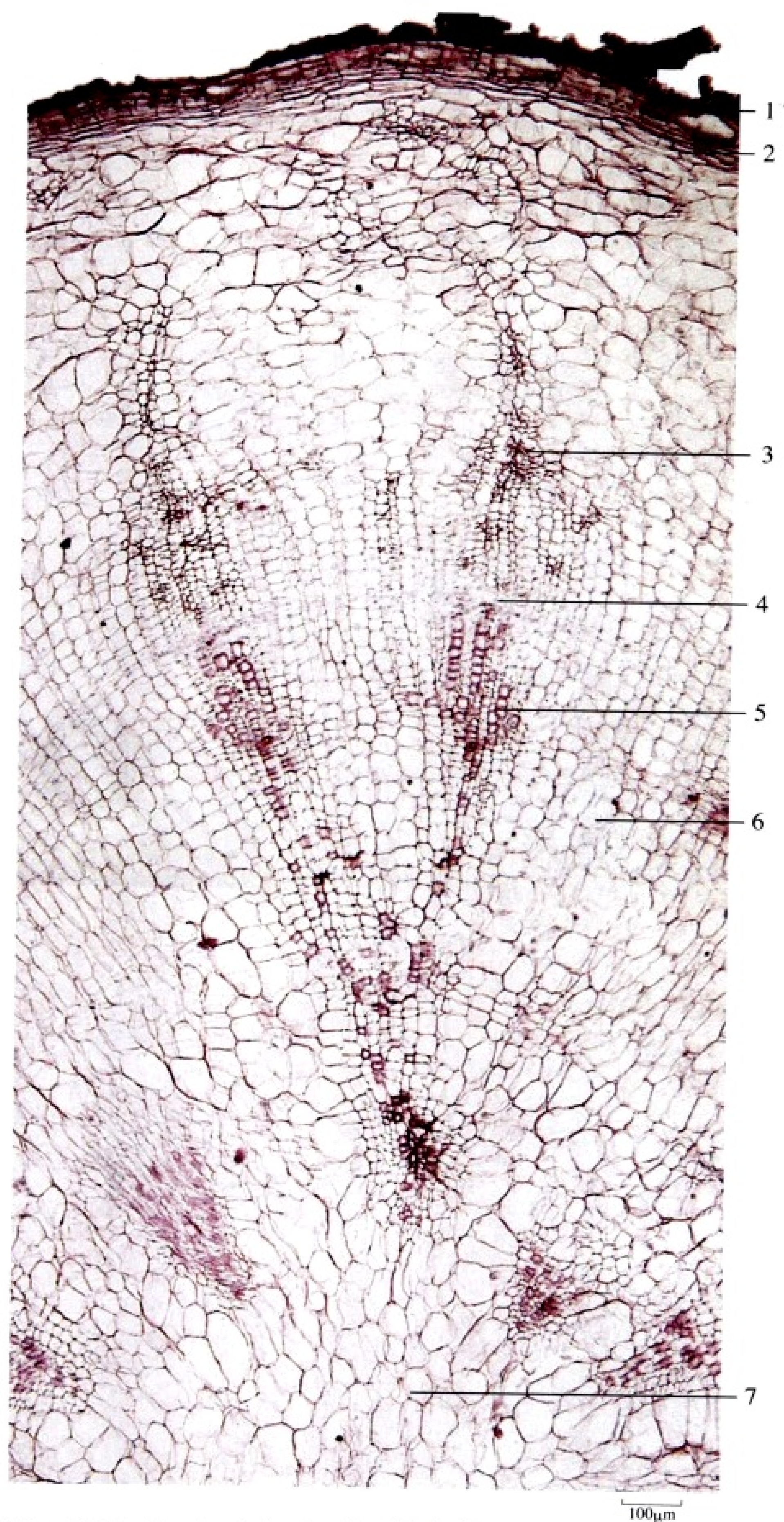


图1 天葵子（*Semiaquilegia adoxoides* 块根） 横切面

[Fig1 Transverse section of tuber root from *Semiaquilegia adoxoides*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 韧皮部（Phloem） 4. 形成层（Cambium） 5. 木质部（Xylem） 6. 木射线（Xylem rays） 7. 髓（Pith）

本品为毛茛科植物天葵*Semiaquilegia adoxoides*（DC.）Makino的干燥块根。

[显微特征] **本品横切面**：木栓层为多列细胞，含棕色物。栓内层较窄。韧皮部宽广。形成层成环。木质部射线宽至20余列细胞，导管放射状排列。有的可见细小髓部。（图1）

Transverse section: Cork consisting of more layers of cells containing brown substances. Phelloderm relatively narrow. Phloem broad. Cambium in a ring. Xylem rays up to 20 or more rows of cells, vessels arranged radially. Sometimes a small pith visible. (Fig 1)

云　芝

Yunzhi

CORIOLUS

本品为多孔菌科真菌彩绒革盖菌 *Coriolus versicolor*（L. ex Fr.）Quel的干燥子实体。

[显微特征]　**本品纵切面**：皮壳外侧为绒毛层，为长短不等的菌丝，菌丝不分枝；皮壳菌丝紧密排列，菌丝胞腔内含众多的色素颗粒。菌肉层厚，无色，菌丝排列紧密。最下方为菌管层，菌管排列整齐。(图1)

Longitudinal section: Shell exterior with hairs layer composed of hyphaes in different length; hyphae no branch, arranging densely, containing numerous pigment granules. Sporophore layer thick, colourless, hyphaes arranging densely. Fungi tube layer situated at the lowest-side, composed of fungi tubes and arranging in order.（Fig 1）

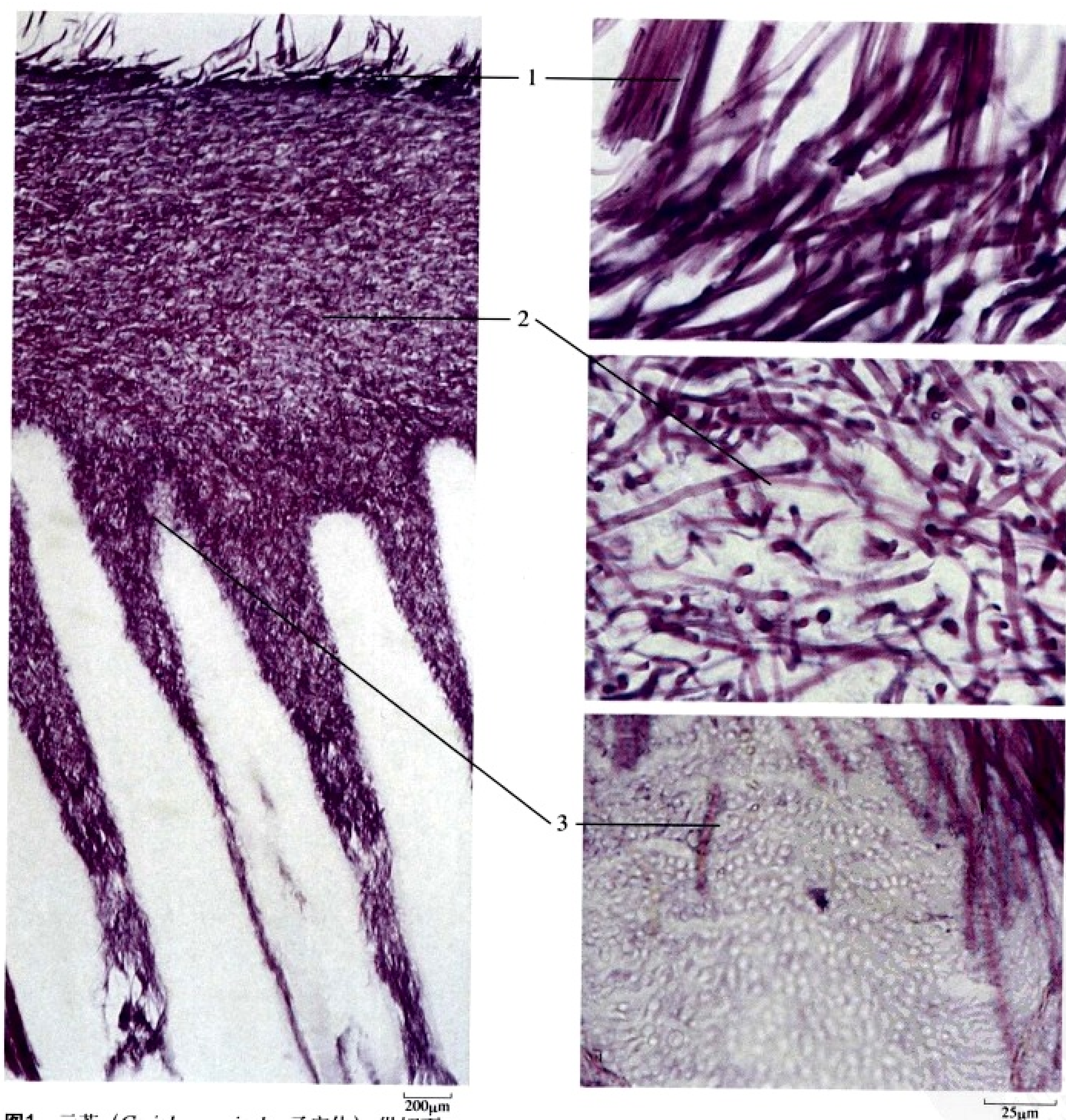


图1　云芝（*Coriolus versicolor* 子实体）纵切面

[Fig1　Longitudinal section of sporophore of *Coriolus versicolor*]

1. 绒毛层（Hairs layer）　2. 菌肉层（Sporophore layer）　3. 菌管层（Fungi tube layer）

本品粉末：淡黄色。孢子卵圆形，长5～7μm，直径2～3μm，壁两层，外壁平滑无色，内壁浅褐色。菌丝分4种：绒毛菌丝无色，单个或数个相连，不分枝，直径3～5μm，菌丝壁有多数颗粒性物质；骨架菌丝较粗，直径5～7μm，不分枝，壁较平直，无色；生殖菌丝壁极薄，透明，直径3～4μm，不分枝，壁平直；缠绕菌丝较细，直径1.5～4μm，常弯曲。(图2)

Powder: Pale yellow. Spores ovoid, 5～7μm long, 2～3μm in diameter, outer walls flat and colourless, inner wall pale brown. Hyphae consisting of four kinds: hair hypha colourless, one or some cells connected, no branch, 3～5μm in diameter, walls with numerous granular substance; skeleton hypha relatively wide, 5～7μm in diameter, no branch, cell walls relatively smooth, colourless; breeding hypha with very thin and smooth walls and transparent, 3～4μm in diameter, no branch; entwining hypha relatively thin, 1.5～4μm in diameter, usually curved. (Fig 2)

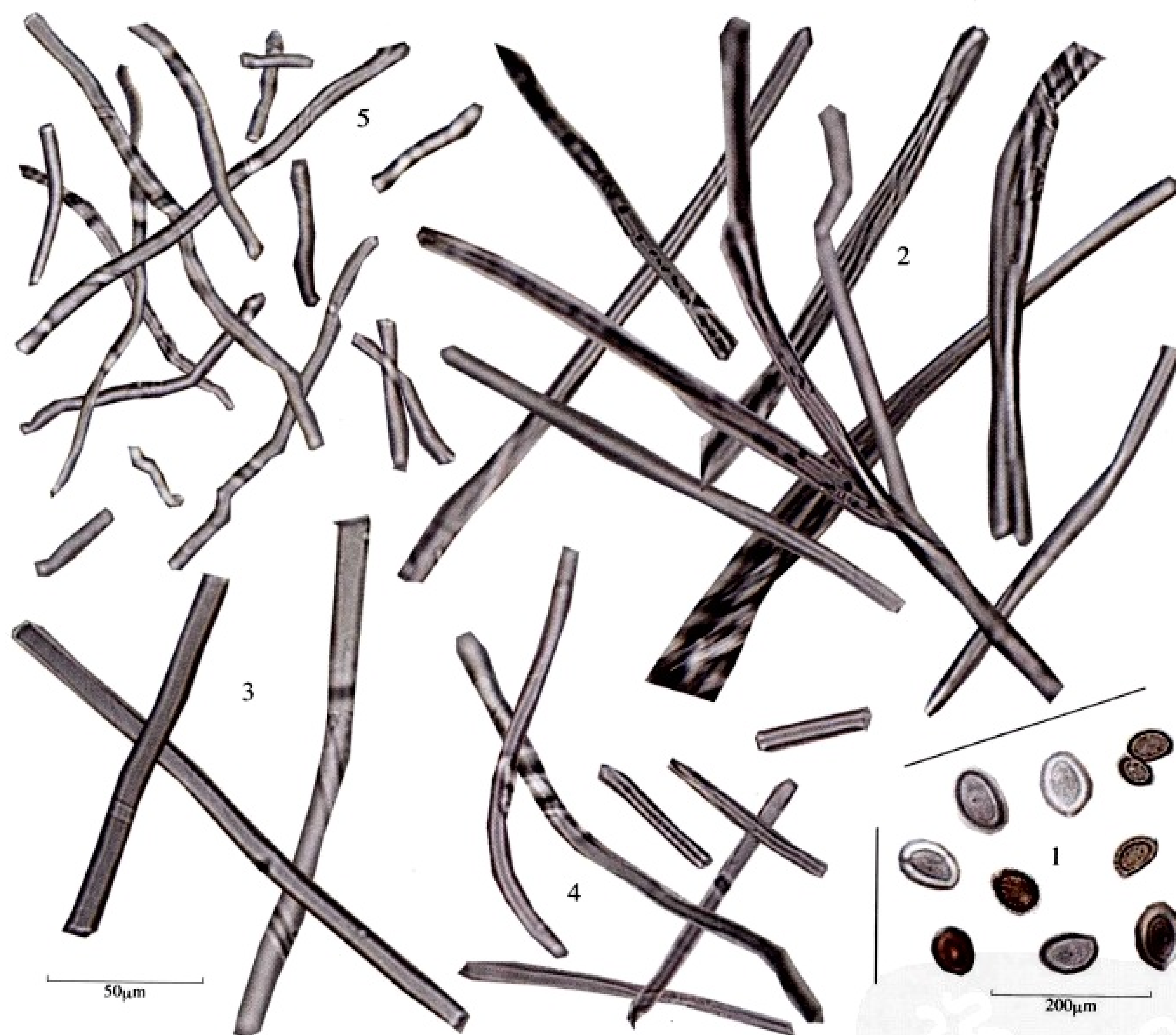


图2 云芝（*Coriolus versicolor* 子实体）粉末

[Fig2 Powder of sporophore from *Coriolus versicolor*]

1. 孢子（Spores） 2. 绒毛菌丝（Hair hyphae） 3. 骨架菌丝（Skeleton hyphae）
4. 生殖菌丝（Breeding hyphae） 5. 缠绕菌丝（Entwining hyphae）

木　瓜

Mugua

FRUCTUS CHAENOMELIS

本品为蔷薇科植物贴梗海棠 *Chaenomeles speciosa*（Sweet）Nakai的干燥近成熟果实。

[显微特征]　本品粉末：黄棕色至棕红色。石细胞较多，成群或散在，无色、淡黄色或橙黄色，圆形、长圆形或类多角形，直径20～82μm，层纹明显，孔沟细，胞腔含棕色或橙红色物。外果皮细胞多角形或类多角形，直径10～35μm，胞腔内含棕色或红棕色物。中果皮薄壁细胞，淡黄色或浅棕色，类圆形，皱缩，偶含细小草酸钙方晶。（图1）

Powder: Yellowish-brown or reddish-brown. Stone cells in groups or scattered, colourless, pale yellow or orange, rounded, elliptical or subpolygonal, 20 ~ 82μm in diameter, striation well-defined, pit-canal minute, lumina containing brown or orange substances. Exocarp cells polygonal or subpolygonal, 10 ~ 35μm in diameter, lumina containing brown or reddish-brown substances. Mesocarp parenchymatous cells pale yellow or pale brown, subrounded, wrinkled, occasionally containing minute prisms of calcium oxalate. (Fig 1)

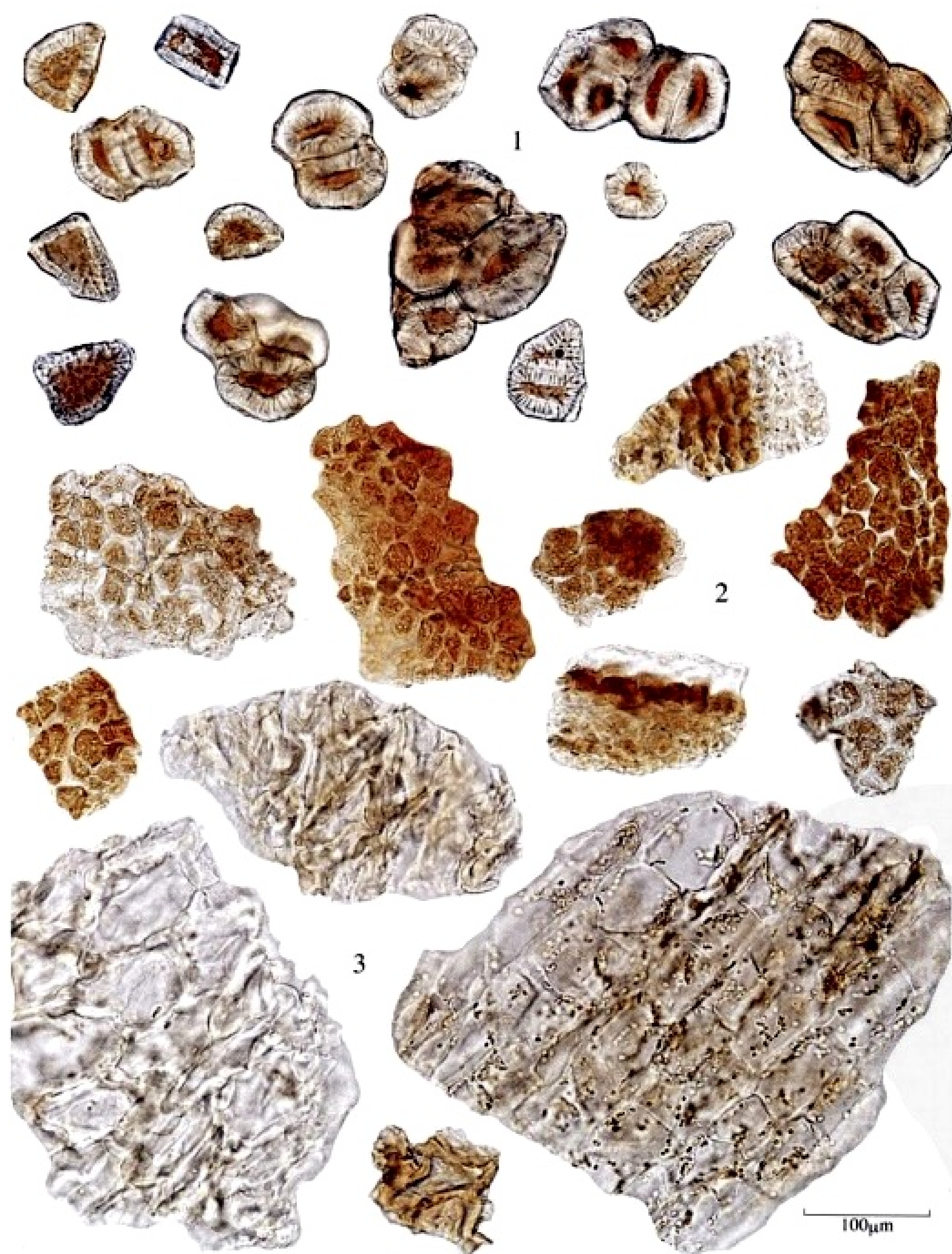


图1　木瓜（*Chaenomeles speciosa* 近成熟果实）粉末

[Fig1　Powder of nearly ripe fruit from *Chaenomeles speciosa*]

1. 石细胞（Stone cells）　2. 外果皮细胞（Exocarp cells）　3. 中果皮薄壁细胞（Mesocarp parenchymatous cells）

木　香

Muxiang

RADIX AUCKLANDIAE

本品为菊科植物木香 *Aucklandia lappa* Decne. 的干燥根。

[显微特征]　**本品粉末**：黄绿色。菊糖多见，表面现放射状纹理。木纤维多成束，长梭形，直径16～24μm，纹孔口横裂缝状、十字状或人字状。网纹导管多见，也有具缘纹孔导管，直径30～90μm。油室碎片有时可见，内含黄色或棕色分泌物。(图1)

Powder: Yellowish-green. Inulin more frequent, with radial striations. Xylem fibres mostly in bundles, long fusiform, 16～24μm in diameter, pit apertures transversal slit, crisscross or V-shaped. Reticulated vessels more frequent, bordered pitted vessels visible, 30～90μm in diameter. Fragments of oil cavities visible, containing yellow or brown contents. (Fig 1)



图1　木香（*Aucklandia lappa* 根）粉末

[Fig1　Powder of root from *Aucklandia lappa*]

1. 菊糖（Inulin）　2. 木纤维（Xylem fibres）　3. 导管（Vessels）　4. 油室碎片（Fragments of oil cavities）

木　贼

Muzei

HERBA EQUISETI HIEMALIS

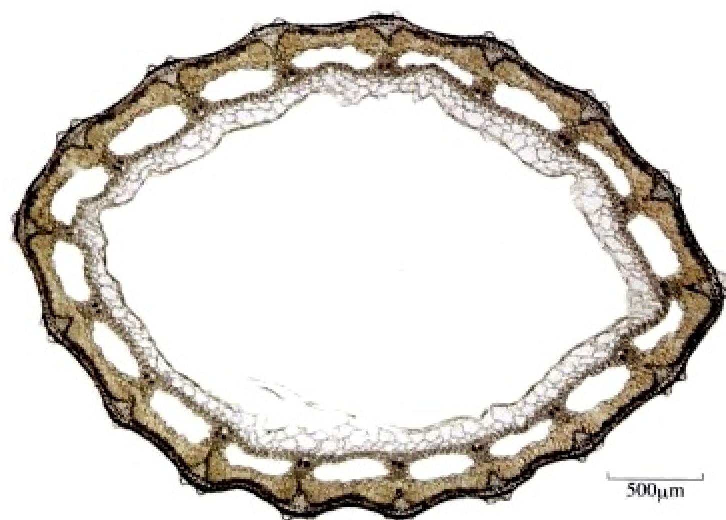


图1　木贼（*Equisetum hiemale* 茎）横切面

[Fig1　Transverse section of stem of *Equisetum hiemale*]

本品为木贼科植物木贼 *Equisetum hiemale* L. 的干燥地上部分。

[显微特征]　**本品茎横切面**：表皮细胞1列，外被角质层。表面有凹陷的沟槽和凸起的棱脊。棱脊上有透明硅质疣状突起2个，沟槽内有凹陷的气孔2个。皮层为薄壁组织，细胞呈长柱状或类圆形，位于棱脊内方的厚壁组织成楔形伸入皮层薄壁组织中。沟槽内厚壁组织仅1～2层细胞，沟槽下方有一空腔；内皮层有内外两列，外列呈波状环形，内列呈圆环状，均可见明显凯氏点。维管束外韧型，位于两列内皮层之间与纵棱相对，维管束内侧均有一束内腔。髓薄壁细胞扁缩，中央为髓腔。（图1～3）

Transverse section of stem: Epidermal cells 1 layer, covered with cuticle, with sunken grooves and protuberant ridges. On surface, showing 2 transparent silica protuberances on each ridge and 2 sunken stomata in each groove. Cortex parenchymatous cells long cylindrical or subrounded; sclerenchyma occurring inside ridges and inserting into cortex parenchyma in cuneate shape. Sclerenchyma in grooves 1 ~ 2 layers, an empty cavity located under each groove. Endodermis of 2 layers, outer one in sinuous ring, and inner one in rounded ring, casparian dots distinct in both the layers. Vascular bundles collateral, located between two layers of endodermis and beneath the ridges, a lumen occurring in inner part of each vascular bundle. Pith parenchymatous cells located inside endodermis, and flattened and shrunken, pith cavity in centre. (Fig 1 ~ 3)

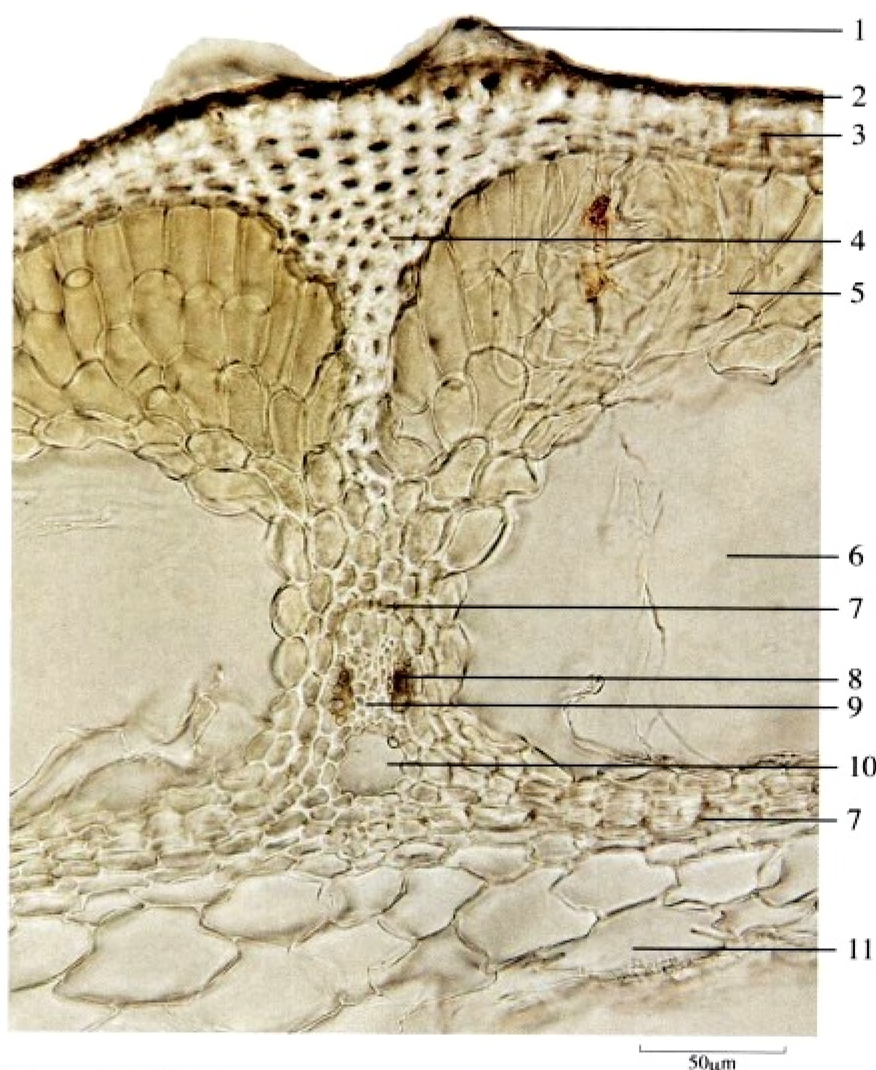


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 疣状突起（Protuberances）　2. 表皮（Epidermis）　3. 气孔（Stoma）　4. 厚壁组织（Sclerenchyma）　5. 薄壁组织（Parenchyma）　6. 皮层空腔（Vallecular cavity）　7. 内皮层（Endodermis）　8. 木质部（Xylem）　9. 韧皮部（Phloem）　10. 束内腔（Lumen inside vascular bundle）　11. 髓（Pith）

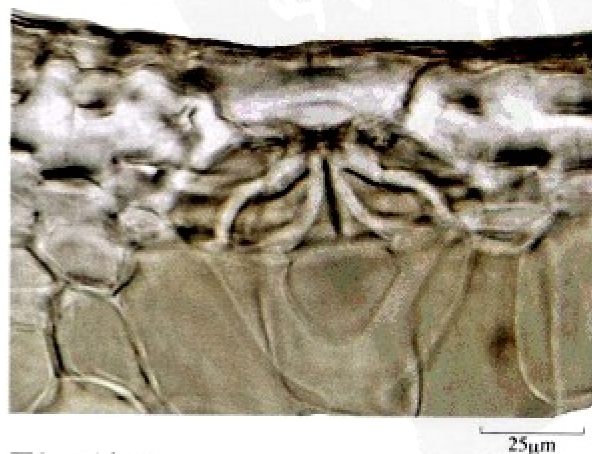


图3　示气孔

[Fig3　Showing stomata]

木 蝴 蝶

Muhudie

SEMEN OROXYLI

本品为紫葳科植物木蝴蝶 *Oroxylum indicum* （L.） Vent. 的干燥成熟种子。

[显微特征] **本品粉末**：黄色或黄绿色。种翅细胞长纤维状，壁波状增厚，直径20～40μm。胚乳细胞多角形，壁呈念珠状增厚。（图1）

Powder: Yellow or yellowish-green. Cells of seed wing long fibre-shaped, with sinuously thickened walls, 20～40μm in diameter. Cells of endosperm polygonal, with beaded walls. （Fig 1）

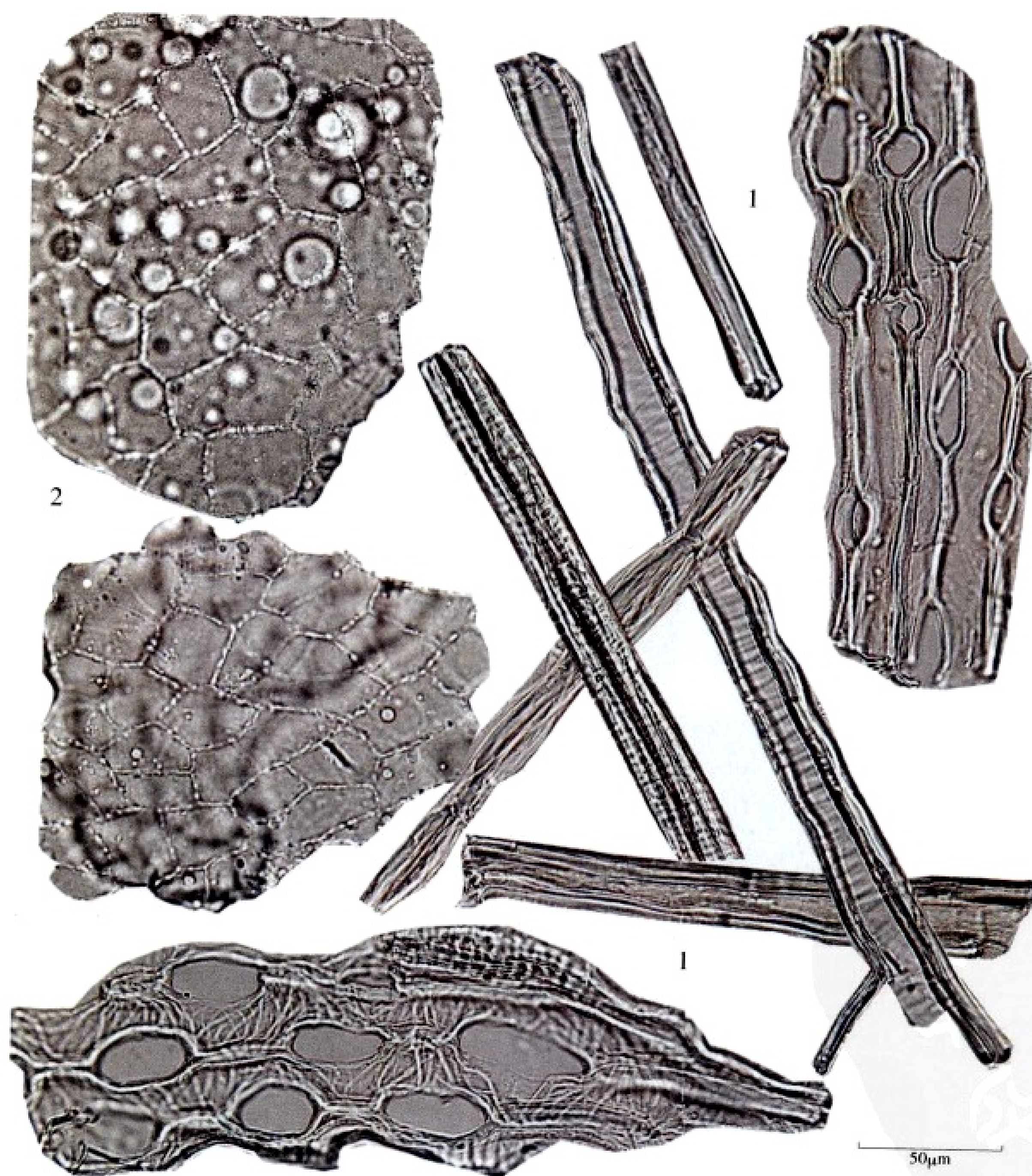


图1 木蝴蝶（*Oroxylum indicum* 种子）粉末

[Fig1 Powder of seed from *Oroxylum indicum*]

1. 种翅细胞（Cells of seed wing） 2. 胚乳细胞（Cells of endosperm）

木　鳖　子

Mubiezi

SEMEN MOMORDICAE

本品为葫芦科植物木鳖 *Momordica cochinchinensis*（Lour.）Spreng. 的干燥成熟种子。

[显微特征]　本品粉末：黄灰色。厚壁细胞椭圆形或类圆形，边缘波状，直径51～117μm，壁厚，木化，胞腔明显，有的狭窄。子叶薄壁细胞多角形，内含脂肪油块及糊粉粒；脂肪油块类圆形，直径27～73μm，表面可见网状纹理。（图1）

Powder: Yellowish-grey. Sclerenchymatous cells elliptical or subrounded, sinuous margined, 51 ~ 117μm in diameter, with thickened and lignified walls, lumina distinct and sometimes narrowed. Parenchymatous cells of cotyledons polygonal, containing fatty oil masses and aleurone grains; fatty oil masses subrounded, 27 ~ 73μm in diameter, reticulated striations visible on the surface. (Fig 1)



图1　木鳖子（*Momordica cochinchinensis* 种子）粉末

[Fig1　Powder of seed from *Momordica cochinchinensis*]

1. 厚壁细胞（Sclerenchymatous cells）　2. 子叶细胞（Cells of cotyledons）　3. 脂肪油块（Fixed oil masses）

五 加 皮

Wujiapi

CORTEX ACANTHOPANACIS

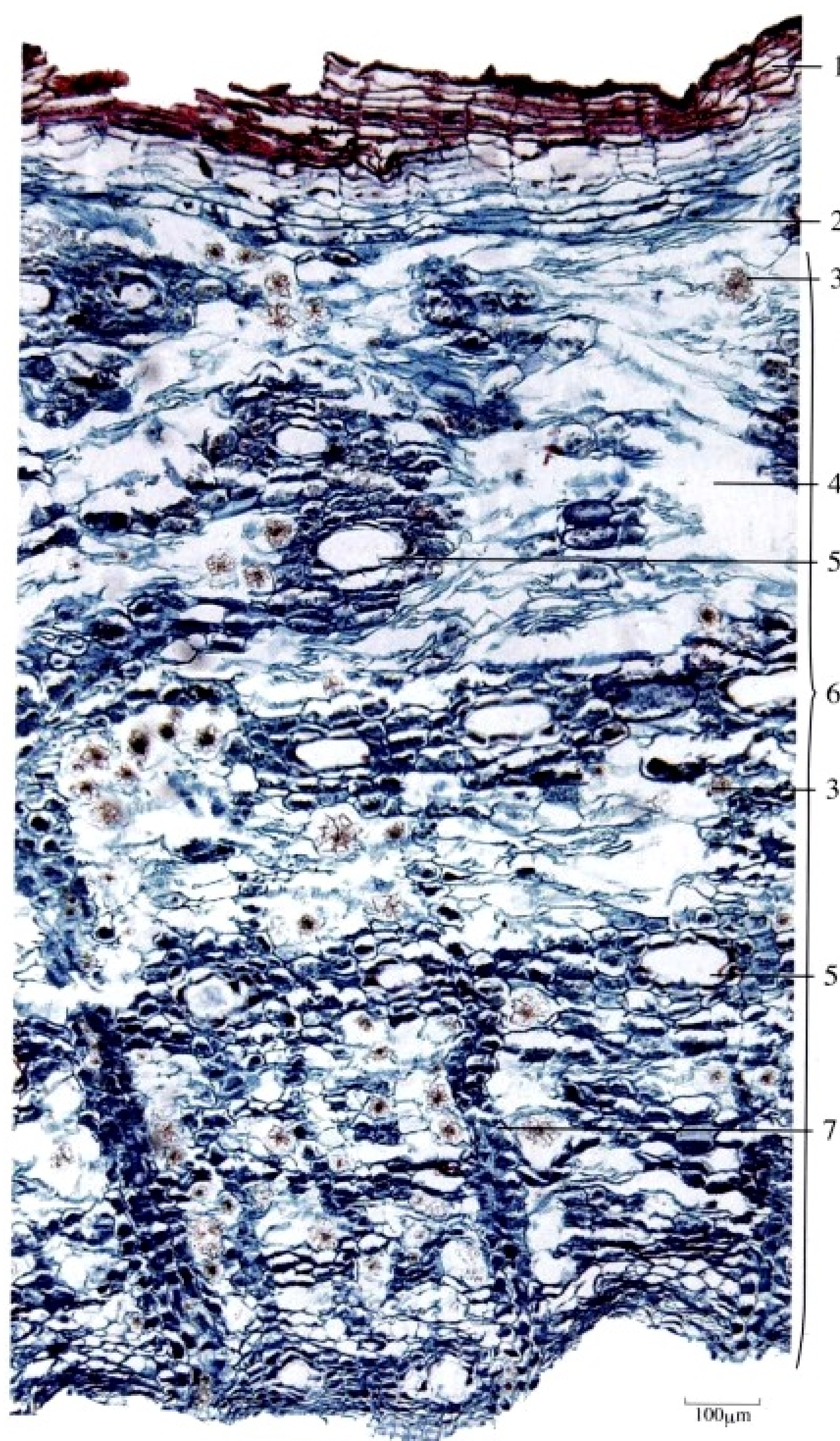


图1 五加皮（*Acanthopanax gracilistylus* 根皮）横切面

[Fig1 Transverse section of root bark from *Acanthopanax gracilistylus*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 草酸钙簇晶（Clusters of calcium oxalate） 4. 裂隙（Clefts） 5. 分泌道（Secretory canals） 6. 韧皮部（Phloem） 7. 韧皮射线（Phloem rays）

本品为五加科植物细柱五加 *Acanthopanax gracilistylus* W. W. Smith的干燥根皮。

[显微特征] **本品横切面：**木栓层为数列细胞。栓内层窄，有少数分泌道散在。韧皮部宽广，外侧有裂隙，射线宽1～5列细胞；分泌道较多，周围分泌细胞4～11个。薄壁细胞含草酸钙簇晶及细小淀粉粒。（图1、2）

Transverse section: Cork cells several layers. Phelloderm narrow, scattered with a few secretory canals. Phloem broad, with clefts in the outer part, phloem rays 1 ~ 5 rows of cells; secretory canals fairly frequent, surrounded with 4 ~ 11 secretory cells. Parenchymatous cells containing clusters of calcium oxalate and small starch granules. (Fig 1, 2)

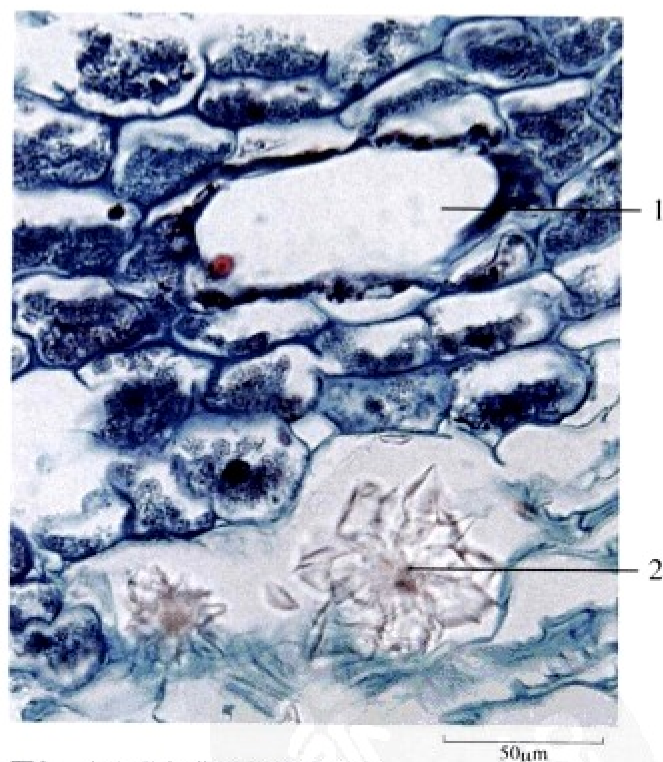


图2 分泌道与草酸钙簇晶放大

[Fig2 Secretory canals and clusters of calcium oxalate magnified]

1. 分泌道（Secretory canals） 2. 草酸钙簇晶（Clusters of calcium oxalate）

本品粉末：灰白色。草酸钙簇晶直径8～64μm，有时含晶细胞连接，簇晶排列成行。木栓细胞长方形或多角形，壁薄；老根皮的木栓细胞有时壁不均匀增厚，有少数纹孔。分泌道碎片含无色或淡黄色分泌物。淀粉粒甚多，单粒多角形或类球形，直径2～8μm；复粒由2分粒至数十分粒组成。（图3）

Powder: Greyish-white. Clusters of calcium oxalate 8～64μm in diameter, sometimes the crystal cells linked together, with clusters arranged in rows. Cork cells rectangular or polygonal, thin-walled; sometimes the walls of cork cells from aged root barks unevenly thickened, less pitted. Fragments of secretory canals containing colourless or pale yellow secretions. Starch granules abundant, simple granules polygonal or subspherical, 2～8μm in diameter; compound granules consisting of 2～10 or more components. （Fig 3）



图3 五加皮（*Acanthopanax gracilistylus* 根皮）粉末

[Fig3 Powder of root bark from *Acanthopanax gracilistylus*]

1. 草酸钙簇晶（Clusters of calcium oxalate） 2. 木栓细胞（Cork cells） 3. 分泌道碎片（Fragments of secretory canals） 4. 淀粉粒（Starch granules）

五 味 子

Wuweizi

FRUCTUS SCHISANDRAE CHINENSIS

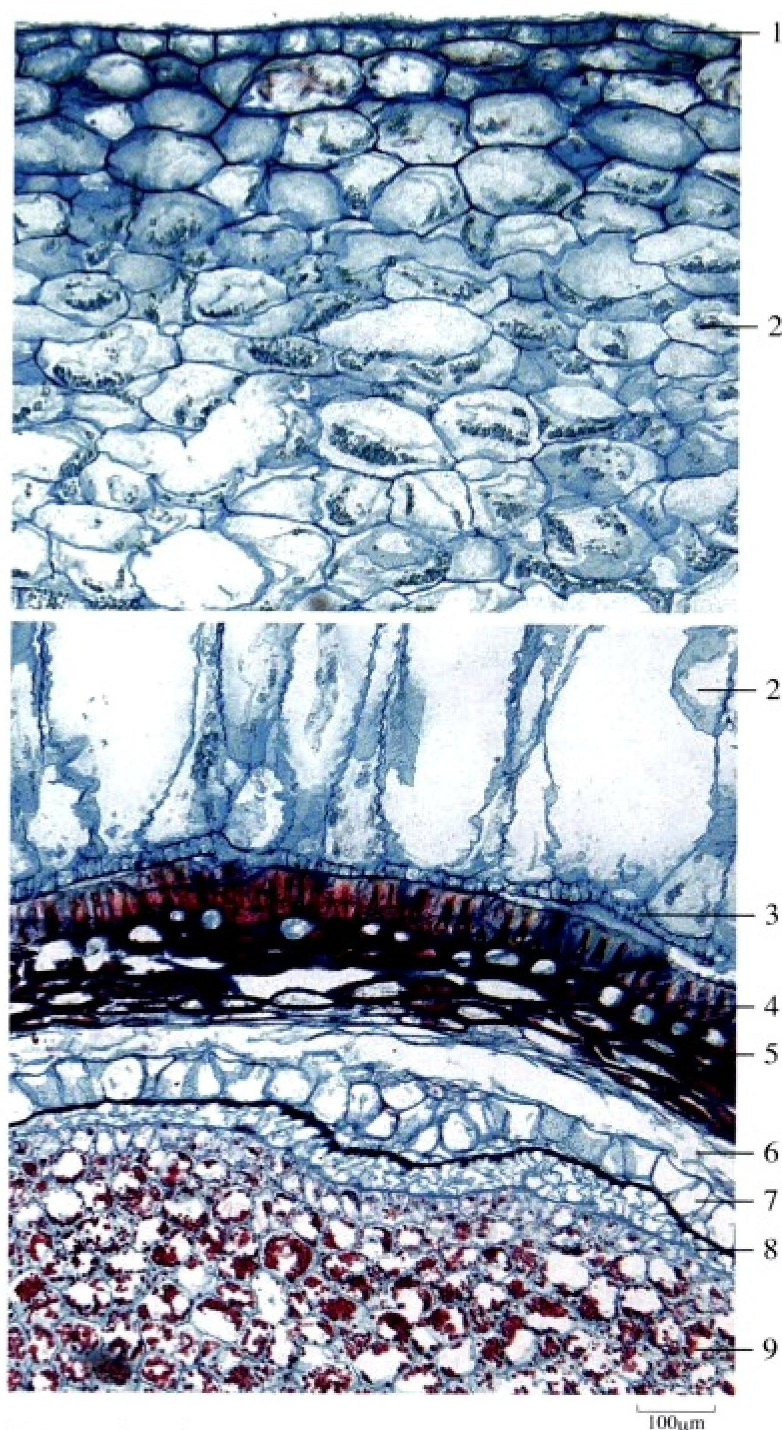


图1 五味子（*Schisandra chinensis* 果实） 横切面
[Fig1 Transverse section of fruit from *Schisandra chinensis*]
1. 外果皮（Exocarp） 2. 中果皮（Mesocarp） 3. 内果皮（Endocarp） 4. 种皮外层石细胞(Outer layer stone cells of testa) 5. 种皮内层石细胞(Inner layer stone cells of testa) 6. 薄壁细胞（parenchymatous cells） 7. 油细胞层（Oil cell layer） 8. 种皮内表皮(Inner epidermal cells of testa) 9. 胚乳细胞(Endosperm cells)

本品为木兰科植物五味子*Schisandra chinensis*（Turcz.） Baill. 的干燥成熟果实。

[显微特征] 本品横切面：外果皮为1列方形或长方形细胞，壁稍厚，外被角质层，散有油细胞；中果皮薄壁细胞10余列，含淀粉粒，散有小型外韧型维管束；内果皮为1列小方形薄壁细胞。种皮最外层为1列径向延长的石细胞，壁厚，纹孔及孔沟细密；其下为数列类圆形、三角形或多角形石细胞，纹孔较大；石细胞层下为数列薄壁细胞，种脊部位有维管束；油细胞层为1列长方形细胞，含棕黄色油滴；再下为3～5列小型细胞；种皮内表皮为1列小细胞，壁稍厚。胚乳细胞含脂肪油滴及糊粉粒。（图1、2）

Transverse section: Exocarp consisting of 1 layer of square or rectangular epidermal cells, walls relatively thickened, covered with cuticle, oil cells scattered; mesocarp consisting of 10 or more layers of parenchymatous cells containing starch granules, scattered with small collateral vascular bundles; endocarp consisting of 1 layer of small square parenchymatous cells. The most outer layer of testa consisting of radially elongated stone cells, thick-walled, with fine and close pits and pit canals; beneath showing several layers of stone cells, subrounded, triangular or polygonal with larger pits; underneath the stone cell layers occurring a few layers of parenchymatous cells, raphe having vascular bundles; oil cell layer consisting of 1 layer of rectangular oil cells containing yellowish-brown volatile oil, with 3 ~ 5 layers of small cells lying below; inner epidermal cells of testa small, slightly thick-walled; endosperm cells containing oil droplets and aleurone grains. （Fig 1, 2）

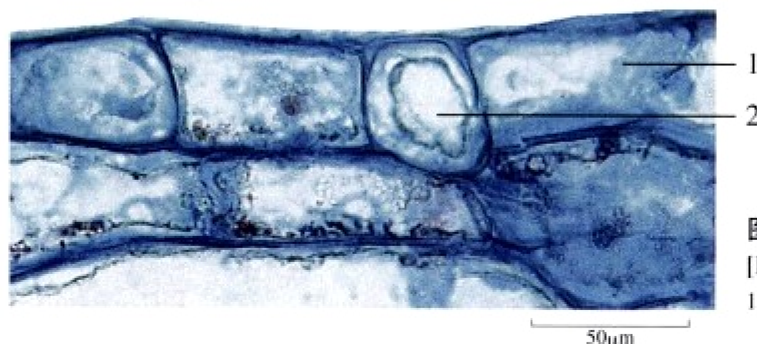


图2 外果皮放大
[Fig2 Exocarp magnified]
1. 外果皮（Exocarp） 2. 油细胞（Oil cell）

本品粉末：暗紫色。种皮表皮石细胞表面观呈多角形或长多角形，直径18～50μm，壁厚，孔沟极细密，胞腔内含深棕色物。种皮内层石细胞呈多角形、类圆形或不规则形，直径约至83μm，壁稍厚，纹孔较大。果皮表皮细胞表面观类多角形，垂周壁略呈连珠状增厚，表面有角质线纹；表皮中散有油细胞。中果皮细胞皱缩，含暗棕色物，并含淀粉粒。（图3）

Powder: Dark purple. Stone cells of epidermis of testa polygonal or elongated-polygonal in surface view, 18～50μm in diameter, walls thickened with very fine and close pit canals, lumina containing dark brown contents. Stone cells of the inner layers of testa polygonal, subrounded or irregular, up to 83μm in diameter, walls slightly thickened, with relatively large pits. Epidermal cells of pericarp polygonal in surface view, anticlinal walls slightly beaded, with cuticle striations, scattered with oil cells. Cells of mesocarp shrivelled, containing dark brown contents and starch granules. （Fig 3）



图3 五味子（*Schisandra chinensis* 果实）粉末

[Fig3 Powder of fruit from *Schisandra chinensis*]

1. 种皮表皮石细胞[Epidermal stone cells（a. 表面观Surface view b. 断面观Section view）] 2. 种皮内层石细胞（Inner layer stone cells of testa） 3. 果皮表皮细胞（Epidermal cells of pericarp） 4. 中果皮细胞（Mesocarp cells）

太 子 参

Taizishen

RADIX PSEUDOSTELLARIAE

本品为石竹科植物孩儿参*Pseudostellaria heterophylla*（Miq.） Pax ex Pax et Hoffm. 的干燥块根。

[显微特征] **本品横切面**：木栓层为2～4列类方形细胞。栓内层薄，仅数列薄壁细胞，切向延长。韧皮部窄，射线宽广。形成层成环。木质部占根的大部分，导管稀疏排列成放射状，初生木质部3～4原型。薄壁细胞充满淀粉粒和草酸钙簇晶。（图1、2）

Transverse section: Cork consisting of 2～4 layers of subsquare cells. Phelloderm narrow, only consisting of several layers of parenchymatous cells, elongated tangentially. Phloem narrow, with broad rays. Cambium in a ring. The majority of root occupied by xylem, vessels sparse and arranged radially, primary xylem occurring in triarch or tetrarch from. Parenchymatous cells packed with starch granules and clusters of calcium oxalate. (Fig 1, 2)

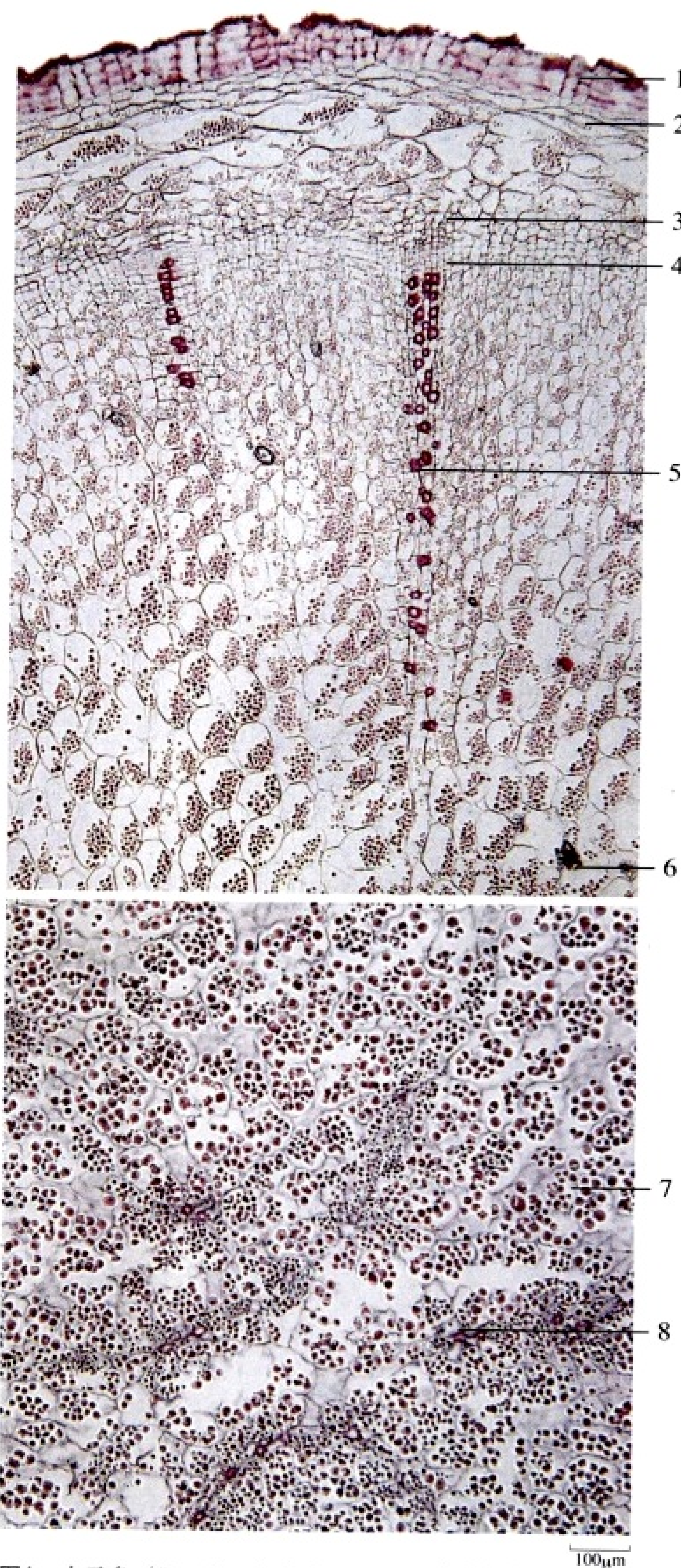


图1 太子参（*Pseudostellaria heterophylla* 块根） 横切面

[Fig1 Transverse section of tuber root from *Pseudostellaria heterophylla*]

1. 木栓层（Cork） 2. 栓内层（Cortex） 3. 韧皮部（Phloem） 4. 形成层（Cambium） 5. 木质部（Xylem） 6. 草酸钙簇晶（Clusters of calcium oxalate） 7. 淀粉粒（Starch granules） 8. 初生木质部 （Primary xylem）

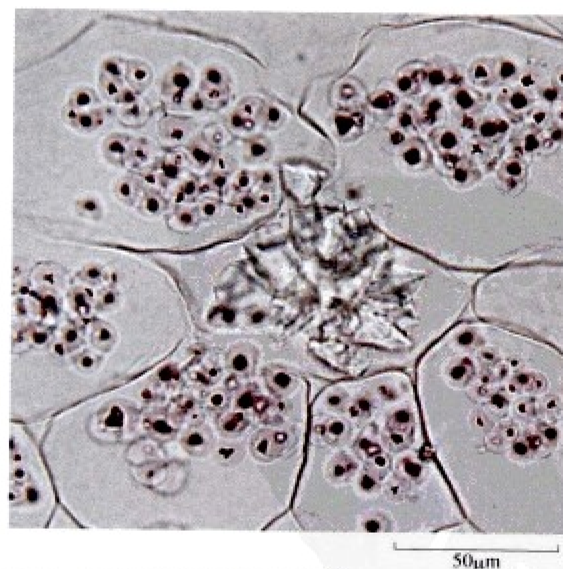


图2 示淀粉粒及草酸钙簇晶

[Fig2 Showing starch granules and clusters of calcium oxalate]

车 前 子

Cheqianzi

SEMEN PLANTAGINIS

本品为车前科植物车前*Plantago asiatica* L. 或平车前*Plantago depressa* Willd. 的干燥成熟种子。

[显微特征] **车前**：粉末深黄棕色。种皮外表皮细胞断面观类方形或略切向延长，细胞壁黏液质化。种皮内表皮细胞表面观类长方形，直径5～19μm，长约至83μm，壁薄，微波状，常作镶嵌状排列。内胚乳细胞壁甚厚，充满细小糊粉粒（图1）。

平车前：种皮内表皮细胞较小，直径5～15μm，长11～45μm。

Powder of seed of *Plantago asiatica*: Dark yellowish-brown. The outer epidermal cells of testa subsquare or slightly elongated tangentially in sectional view, with mucilaginous walls. The inner epidermal cells of testa subrectangular in surface view, 5～19μm in diameter, up to about 83μm long, thin walled, slightly sinuous, usually parqueted. The endosperm cells with heavily thickened walls, filled with small aleurone grains. （Fig 1）

Seed of *Plantago depressa*: The inner epidermal cells of testa relatively small, 5～15μm in diameter, 11～45μm long.

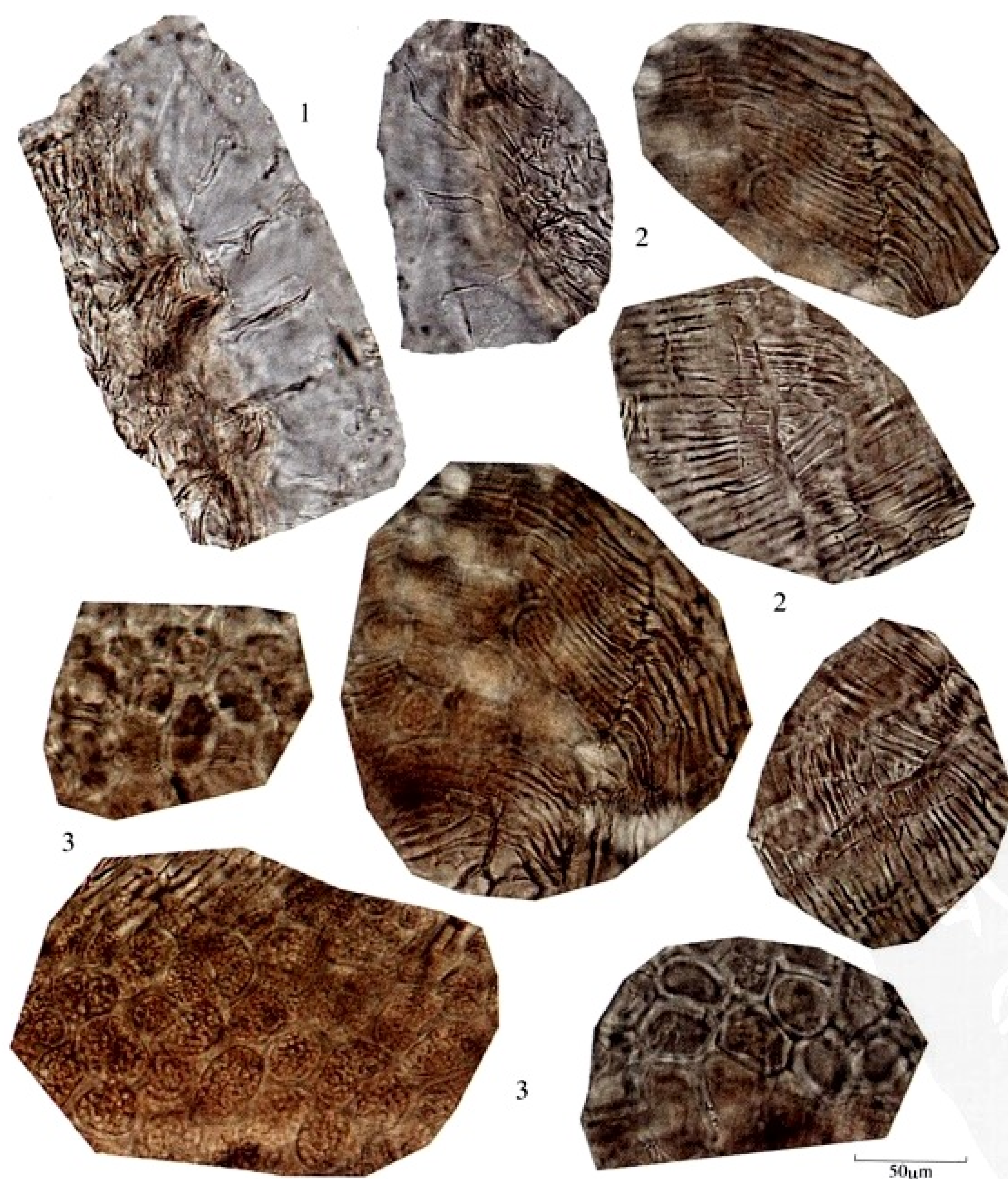


图1 车前子（*Plantago asiatica* 种子）粉末

[Fig1 Powder of seed from *Plantago asiatica*]

1. 种皮外表皮细胞（Outer epidermal cells of testa） 2. 种皮内表皮细胞（Inner epidermal cells of testa）
3. 内胚乳细胞（Endosperm cells）

车 前 草
Cheqiancao
HERBA PLANTAGINIS

本品为车前科植物车前*Plantago asiatica* L. 或平车前*Plantago depressa* Willd. 的干燥全草。

[显微特征]　本品叶表面观：车前　上、下表皮细胞类长方形，上表皮细胞具角质线纹。气孔不定式，副卫细胞3～4个。腺毛头部2细胞，椭圆形，柄单细胞。非腺毛少见，2～5细胞，长100～320μm，壁稍厚，微具疣状突起。(图1)

Surface view of leaf: *Plantago asiatica*: Epidermal cells of both surfaces subrectangular, the upper epidermal cells with striated cuticle; stomata anomocytic, subsidiary cells 3～4. Glandular hairs each with an elliptical head of 2 cells and an unicellular stalk. Non-glandular hairs infrequent, 2～5 celled, 100～320μm long, with slightly thickened and faintly warty walls. (Fig 1)

平车前　非腺毛3～7细胞，长350～900μm。

Plantago depressa: Non-glandular hair 3～7 celled, 350～900μm long.



图1　车前草（*Plantago asiatica* 叶）表面观

[Fig1　Surface view of leaf from *Plantago asiatica*]

1. 上表皮细胞（Upper epidermal cells）　2. 下表皮细胞（Lower epidermal cells）　3. 腺毛（Glandular hairs）　4. 非腺毛（Non-glandular hairs）

牛 蒡 子

Niubangzi

FRUCTUS ARCTII

本品为菊科植物牛蒡*Arctium lappa* L. 的干燥成熟果实。

[显微特征] **本品粉末**：灰褐色。内果皮石细胞略扁平，表面观呈尖梭形、长椭圆形或尖卵圆形，长70～224μm，宽13～70μm，壁厚约至20μm，木化，纹孔横长；侧面观类长方形或长条形，侧弯。中果皮网纹细胞横断面观类多角形，垂周壁具细点状增厚；纵断面观细胞延长，壁具细密交叉的网状纹理。草酸钙方晶直径3～9μm，成片存在于黄色的中果皮薄壁细胞中，含晶细胞界限不分明。子叶细胞充满糊粉粒，有的糊粉粒中有细小簇晶，并含脂肪油滴。（图1）

Powder: Greyish-brown. Stone cells of endocarp slightly flattened, tapering-fusiform, long- elliptical or tapering-ovate in surface view; 70～224μm long, 13～70μm wide, the walls up to 20μm thick, lignified, with transversely elongated pits; subrectangular or stripe-shaped in lateral view, relatively curved. Reticulate cells of mesocarp polygonal in transverse sectional view, anticlinal walls spotted-thickened; cells elongated in longitudinal sectional view, the walls with fine and dense crisscross striations. Prisms of calcium oxalate 3～9μm in diameter, occurring abundantly in yellow parenchymatous cells of mesocarp, borders of crystal cells indistinct. Cells of cotyledons filled with aleurone grains, some containing small clusters and oil droplets. (Fig 1)

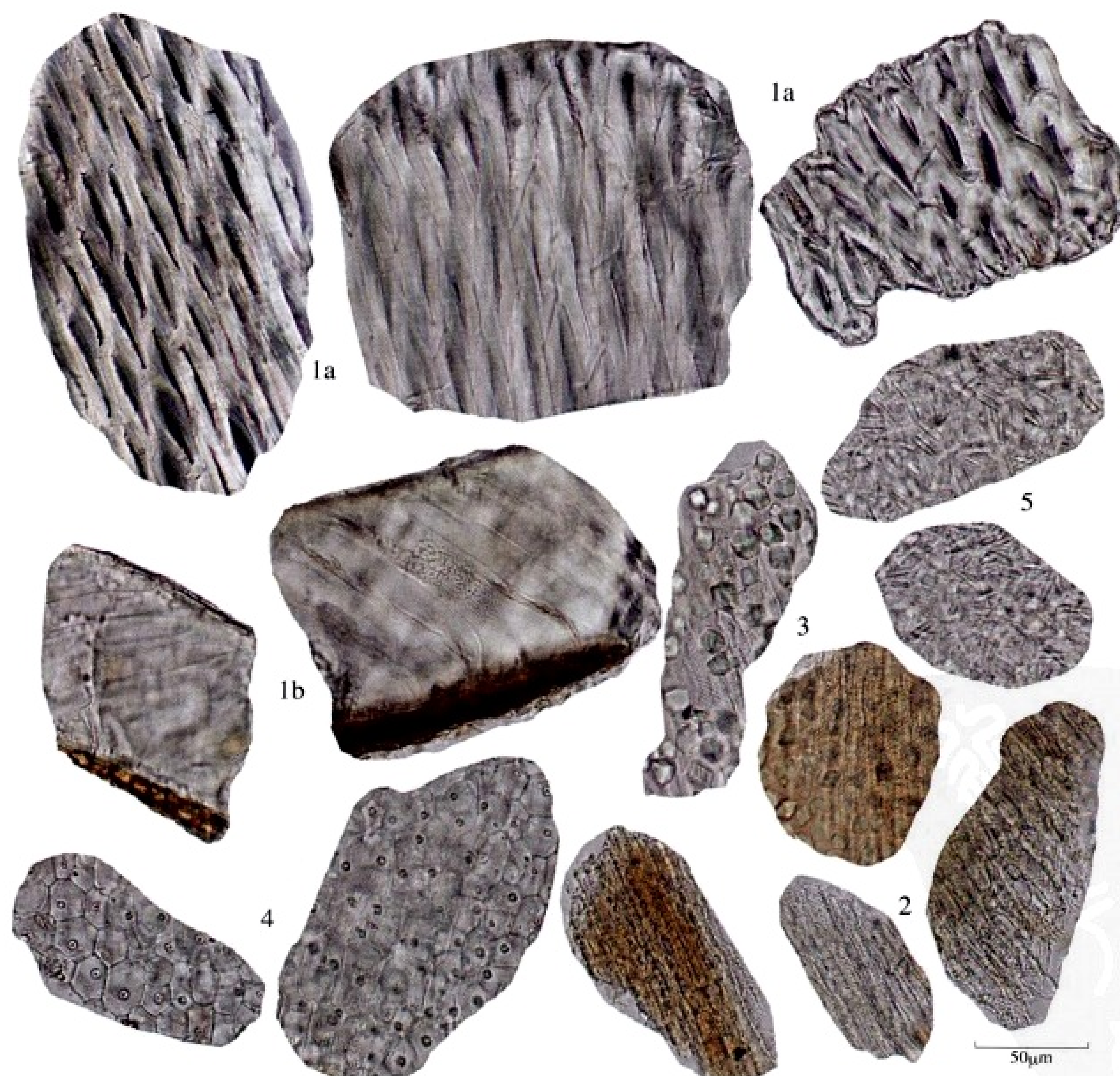


图1 牛蒡子（*Arctium lappa* 果实）粉末

[Fig1 Powder of fruit from *Arctium lappa*]

1. 内果皮石细胞[Stone cells of endocarp（a. 表面观Surface view b. 断面观Section view)] 2. 中果皮网纹细胞（Reticulate cells of mesocarp） 3. 草酸钙方晶（Prisms of calcium oxalate） 4. 子叶细胞（Cells of cotyledons） 5. 种皮细胞（Testa cells）

牛　膝

Niuxi

RADIX ACHYRANTHIS BIDENTATAE

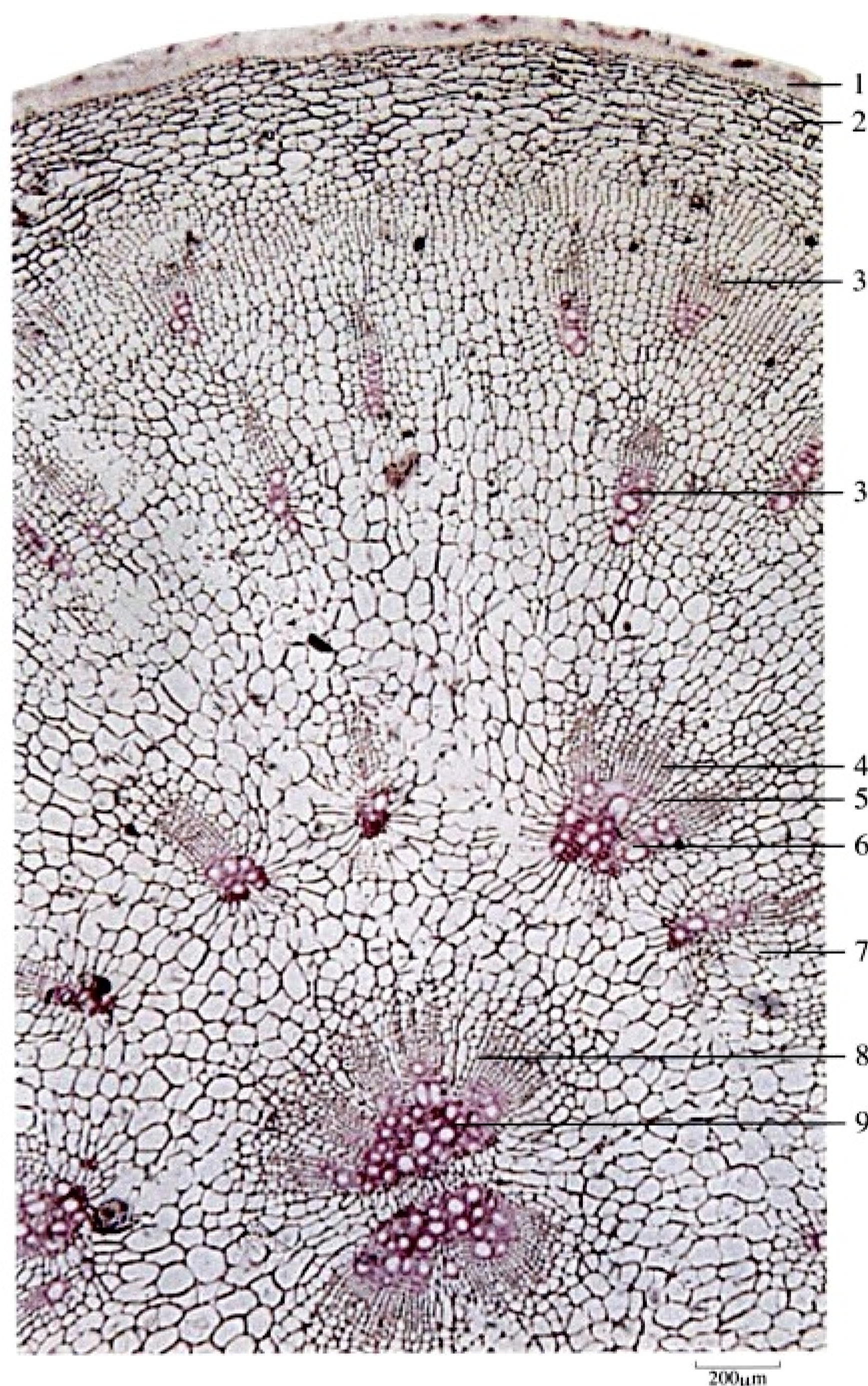


图1　牛膝（*Achyranthes bidentata* 根）横切面

[Fig1　Transverse section of root from *Achyranthes bidentata*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 维管束（Vascular bundle）　4. 韧皮部（Phloem）　5. 形成层（Cambium）　6. 木质部（Xylem）　7. 射线（Rays）　8. 中心韧皮部（Central phloem）　9. 中心木质部（Central xylem）

本品为苋科植物牛膝*Achyranthes bidentata* Bl. 的干燥根。

[显微特征]　本品横切面：木栓层为数列扁平细胞，切向延伸。栓内层较窄。外韧型维管束断续排列成2～4轮，最外轮的维管束较小，有的仅1至数个导管，束间形成层几连接成环，向内维管束较大；木质部主要由导管及小的木纤维组成，根中心木质部集成2～3群。薄壁细胞含有草酸钙砂晶。（图1、2）

Transverse section: Cork consisting of several layers of flattened cells, tangentially elongated. Phelloderm relatively narrow. Collateral vascular bundles arranged in 2 ~ 4 interrupted whorls, relatively small in the outermost whorl, some only 1 to several vessels, cambium nearly in a ring, vascular bundles relatively large inward; xylem consisting of vessels and small xylem fibres, aggregated into 2 ~ 3 groups in the center. Parenchymatous cells containing sand crystals of calcium oxalate.（Fig 1, 2）

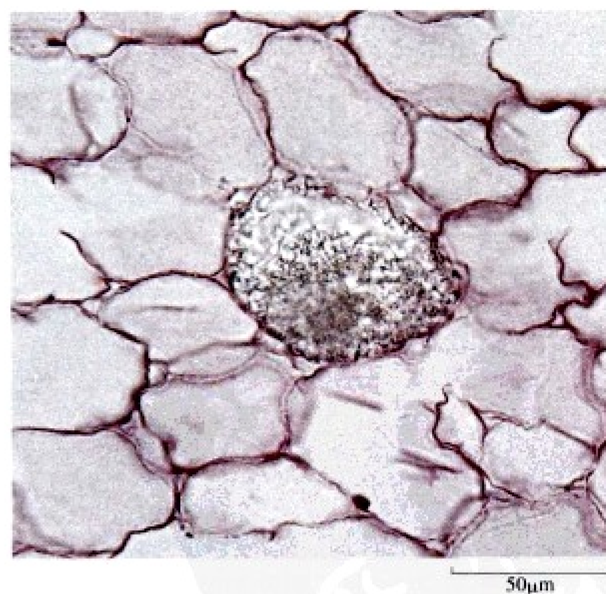


图2　示草酸钙砂晶

[Fig2　Showing sand crystals of calcium oxalate]

毛 诃 子

Maohezi

FRUCTUS TERMINALIAE BILLERICAE

本品系藏族习用药材。为使君子科植物毗黎勒*Terminalia billerica*（Gaertn.）Roxb. 的干燥成熟果实。

[显微特征]　本品粉末：黄褐色。非腺毛易见，为2细胞，基部细胞常内含棕黄色物。草酸钙簇晶众多，直径13～65μm。石细胞类圆形、卵圆形或长方形，孔沟明显，具层纹。内果皮纤维壁厚，木化，孔沟明显。外果皮表皮细胞具非腺毛脱落的疤痕。可见油滴和螺纹导管。（图1）

Powder: Yellowish brown. Non-glandular hairs easily visible, 2-celled, the base cells often containing brownish-yellow contents. Clusters of calcium oxalate abundant, 13～65μm in diameter. Stone cells subrounded, oval or rectangular; pit canal well marked, striated. Fibres of endocarp walls thickened, lignified, pit canal distinct. Epidermal cells of exocarp with numerous scars of fallen non-glandular. Oil droplets and spiral vessels visible. （Fig 1）



图1　毛诃子（*Terminalia billerica* 果实）粉末

[Fig1　Powder of fruit from *Terminalia billerica*]

1. 非腺毛（Non-glandular hairs）　2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 石细胞（Stone cells）　4. 内果皮纤维（Fibres of endocarp）　5. 外果皮表皮细胞（Epidermal cells of exocarp）　6. 导管（Vessels）

片 姜 黄
Pianjianghuang
RHIZOMA WENYUJIN CONCISUM

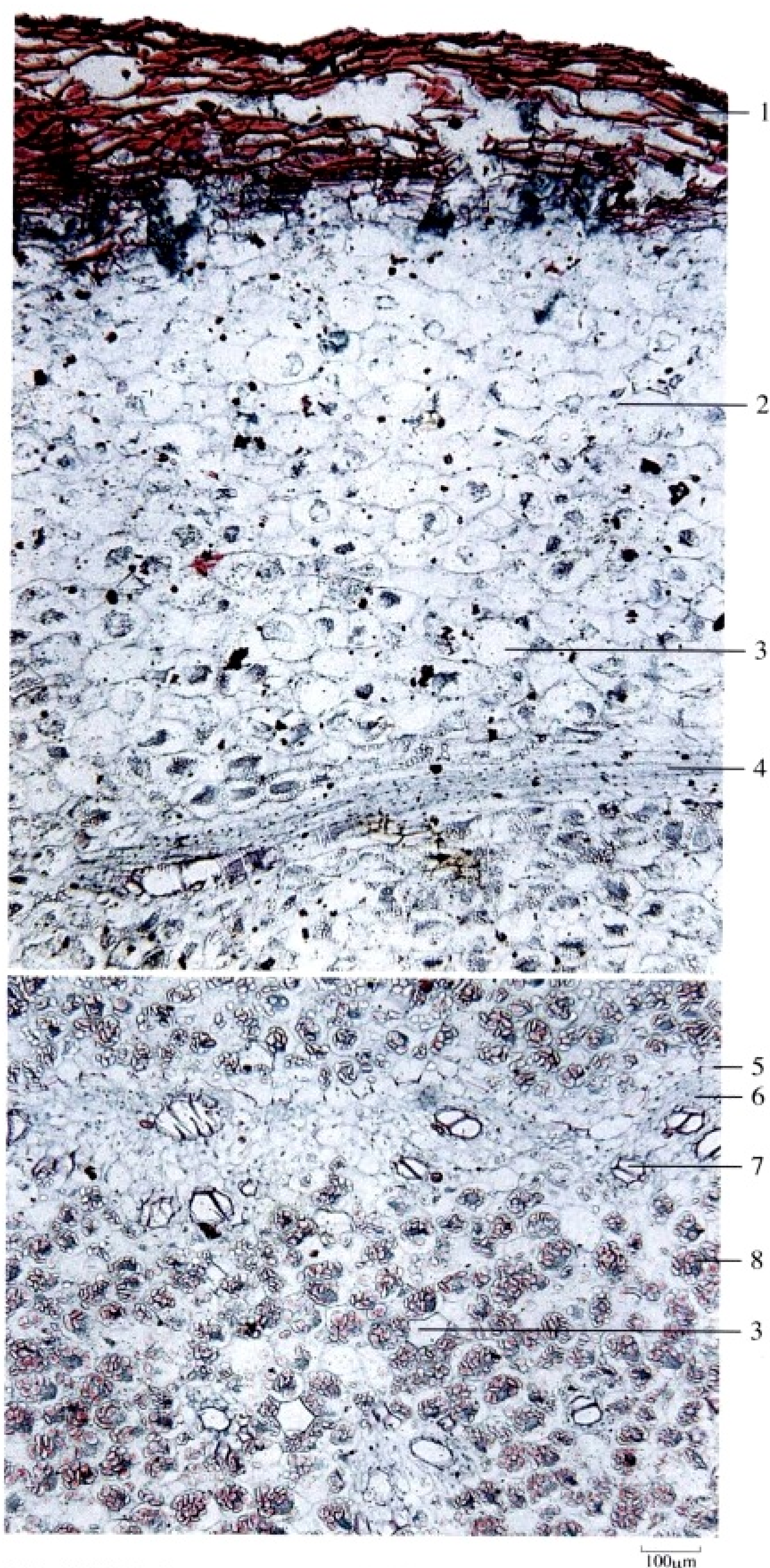


图1 片姜黄（*Curcuma wenyujin* 根茎）横切面
[Fig1 Transverse section of rhizome from *Curcuma wenyujin*]
1. 木栓层（Cork） 2. 皮层 （Cortex） 3. 油细胞（Oil cells） 4. 叶迹维管束（Leaf trace vascular bundles） 5. 内皮层（Endodermis） 6. 韧皮部（Phloem） 7. 木质部 （Xylem） 8. 淀粉粒（Starch granules）

本品为姜科植物温郁金*Curcuma wenyujin* Y. H. Chen et C. Ling的干燥根茎。

[显微特征]　本品横切面：表皮有残留，外壁稍厚。木栓细胞多列。皮层散有叶迹维管束；内皮层明显。中柱大，维管束外韧型，靠外侧的较小，排列紧密，有的木质部仅1～2个导管。皮层及中柱薄壁组织中散有油细胞；薄壁细胞含淀粉粒。（图1、2）

Transverse section: Remaining epidermal cells visible, outer walls slightly thickened. Cork consisting of several layers of cells. Cortex scattered with leaf-trace vascular bundles, endodermis distinct. Stele large, vascular bundles collateral, relatively small outside and arranged densely, some xylem with 1 or 2 vessels only. Parenchyma scattered with oil cells in cortex and stele, parenchymatous cells containing starch granules. (Fig 1, 2)

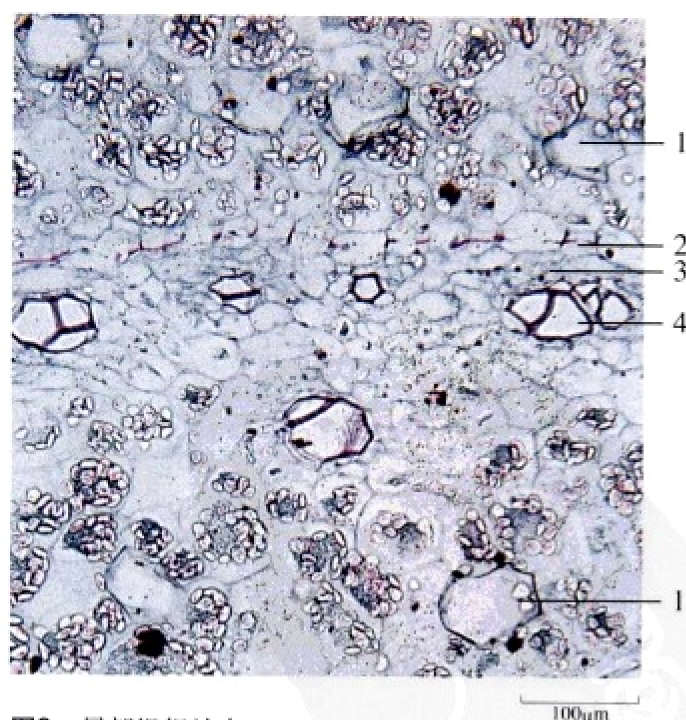


图2 局部组织放大
[Fig2 Partial tissue magnified]
1. 油细胞(Oil cells) 2. 内皮层(Endodermis) 3. 韧皮部(Phloem) 4. 木质部 (Xylem)

化 橘 红
Huajuhong
EXOCARPIUM CITRI GRANDIS

本品为芸香科植物化州柚*Citrus grandis*‘Tomentosa’或柚*Citrus grandis*（L.）Osbeck的未成熟或近成熟的干燥外层果皮。

[显微特征]　本品粉末：暗绿色至棕色。中果皮薄壁细胞形状不规则，壁不均匀增厚，有的作连珠状或在角隅处特厚。果皮表皮细胞表面观多角形、类方形或长方形，垂周壁增厚，气孔类圆形，直径18～31μm，副卫细胞5～7个，侧面观外被角质层，靠外方的径向壁增厚。偶见碎断的非腺毛，碎断细胞多至十数个，最宽处直径约33μm，具壁疣或外壁光滑、内壁粗糙，胞腔内含淡黄色或棕色颗粒状物。草酸钙方晶成片或成行存在于中果皮薄壁细胞中，呈多面体形、菱形、棱柱形、长方形或形状不规则，直径1～32μm，长5～40μm。导管为螺纹和网纹。偶见石细胞及纤维。（图1）

Powder: Dark green to brown. Parenchymatous cells of mesocarp irregular, walls unevenly thickened, some beaded or extremely thickened at corners. Epidermal cells of pericarp polygonal, subsquare or rectangular in surface view, anticlinal walls thickened. Stomata subrounded, 18～31μm in diameter, with 5～7 subsidiary cells covered with cuticle layer in lateral view and the outer radial walls thickened. Broken nonglandular hairs visible occasionally, cells of fragments up to ten or more, about 33μm in diameter at the widest position, walls warty or outer walls smooth and inner walls rough, lumina containing pale yellow or brown granular masses. Prisms of calcium oxalate polyhedral, rhombic, rhomboid-prismatic, rectangular or irregular, 1～32μm in diameter, 5～40μm long, occurring in parenchymatous cells of mesocarp in pieces or in rows. Vessels spiral or reticulate. Stone cells and fibres visible occasionally. (Fig 1)

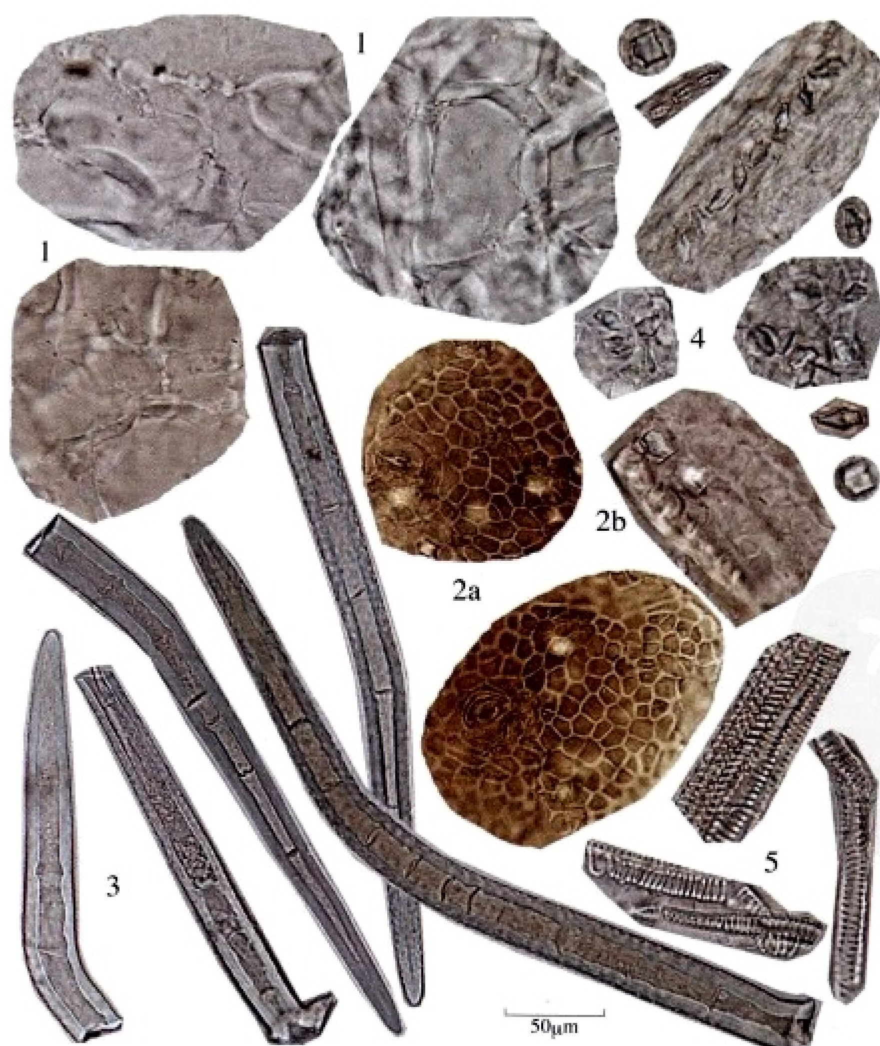


图1　化橘红（*Citrus grandis*‘Tomentosa’外层果皮）粉末

[Fig1　Powder of outer layer of pericarp from *Citrus grandis* "Tomentosa"]

1. 中果皮细胞（Mesocarp cells）　2. 果皮表皮细胞[Epidermal cells of pericarp（a. 表面观Surface view　b. 断面观Section view）]　3. 非腺毛（Non-glandular hairs）　4. 草酸钙方晶（Prisms of calcium oxalate）　5. 导管（Vessels）

乌　药

Wuyao

RADIX LINDERAE

本品为樟科植物乌药*Lindera aggregata*（Sims） Kosterm. 的干燥块根。

[显微特征]　**本品粉末**：黄白色。淀粉粒甚多，单粒类球形、长圆形或卵圆形，直径4～39μm，脐点叉状、人字状或裂缝状；复粒由2～4分粒组成。木纤维淡黄色，多成束，直径20～30μm，壁厚约5μm，有单纹孔，胞腔含淀粉粒。韧皮纤维近无色，长梭形，多单个散在，直径15～17μm，壁极厚，孔沟不明显。具缘纹孔导管直径约至68μm，具缘纹孔排列紧密。木射线细胞壁稍增厚，纹孔较密。油细胞长圆形，含棕色分泌物。（图1）

Powder: Yellowish-white. Starch granules fairly abundant, simple granules subspherical, oblong or ovoid, 4～39μm in diameter, hilum Y-shaped, V-shaped or cleft; compound granules consisting of 2～4 components. Xylem fibres yellowish, mostly in bundles, 20～30μm in diameter, walls about 5μm in thickness, with simple pits, lumina filled with starch granules. Phloem fibres nearly colourless, long spindle-shaped, mostly single and scattered, 15～17μm in diameter, walls very thick, with indistinct pit canals. Bordered pitted vessels up to about 68μm in diameter, with closely arranged bordered pits. Cell walls of xylem rays slightly thickened, densely pitted. Oil cells oblong, containing brown secretion. （Fig 1）



图1　乌药（*Lindera aggregata* 块根）粉末

[Fig1　Powder of tuber root from *Lindera aggregata*]

1. 淀粉粒（Starch granules）　2. 木纤维（Xylem fibres）　3. 韧皮纤维（Phloem fibres）　4. 导管（Vessels）　5. 油细胞（Oil cells）

巴 戟 天

Bajitian

RADIX MORINDAE OFFICINALIS

本品为茜草科植物巴戟天*Morinda officinalis* How的干燥根。

[显微特征]　本品横切面：木栓层为数列细胞。栓内层外侧石细胞单个或数个成群，断续排列成环；薄壁细胞含有草酸钙针晶束，切向排列。韧皮部宽广，内侧薄壁细胞含草酸钙针晶束，轴向排列。形成层明显。木质部导管单个散在或2～3个相聚，呈放射状排列，直径至105μm；木纤维较发达；木射线宽1～3列细胞；偶见非木化的木薄壁细胞群。（图1）

Transverse section: Cork several rows of cells. Stone cells single or several in groups in the outer part of phelloderm, interruptedly arranged in a ring. Parenchymatous cells containing raphides of calcium oxalate, arranged tangentially. Phloem broad, parenchymatous cells in the inner part containing raphides of calcium oxalate arranged axially. Cambium distinct. Vessels in xylem single or 2～3 in groups, arranged radially, up to 105μm in diameter; xylem fibres developed; xylem rays 1～3 rows of cells; non-lignified parenchymatous cells found occasionally. (Fig1)

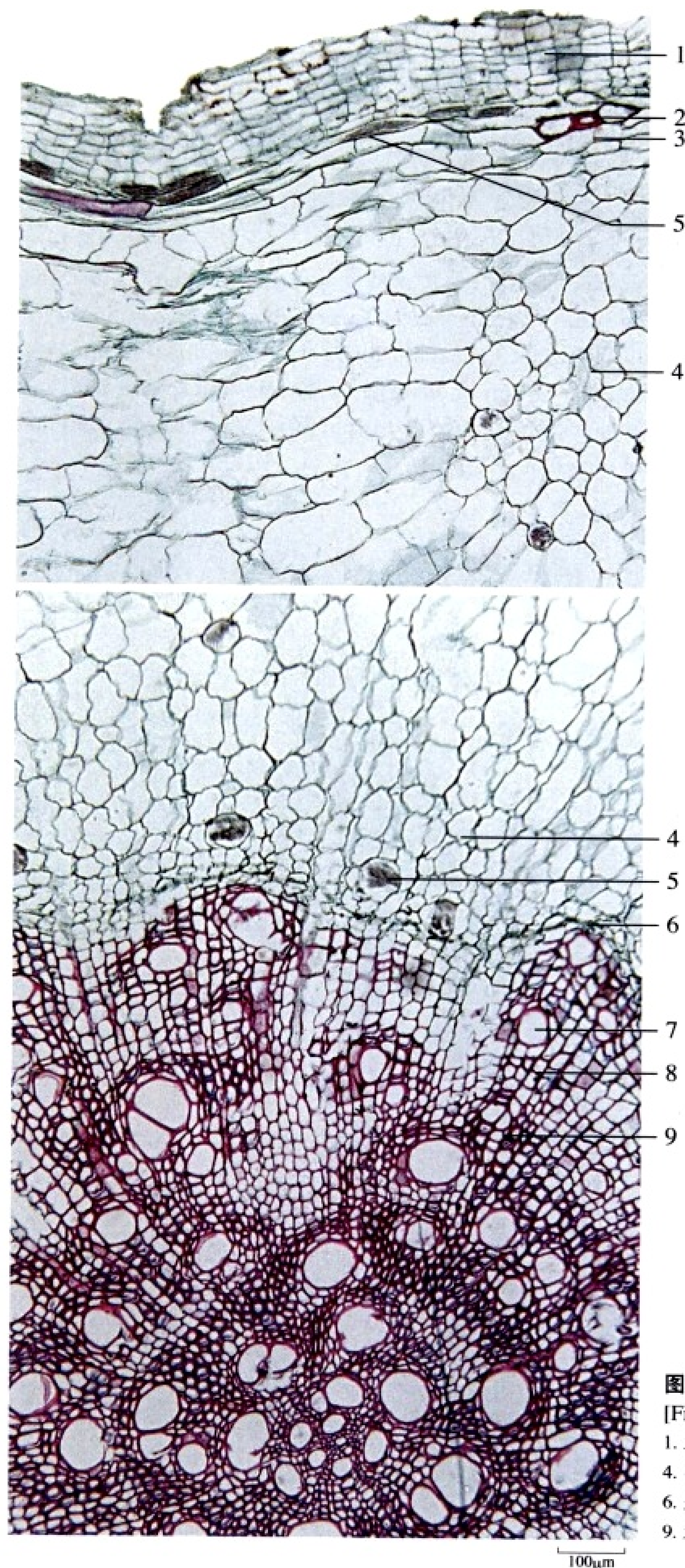


图1　巴戟天（*Morinda officinalis* 根）横切面

[Fig1　Transverse section of root from *Morinda officinalis*]

1. 木栓层（Cork）　2. 石细胞（Stone cells）　3. 栓内层（Cortex）
4. 韧皮部（Phloem）　5. 草酸钙针晶（Raphides of calcium oxalate）
6. 形成层（Cambium）　7. 导管（Vessels）　8. 木射线（Xylem rays）
9. 木纤维（Xylem fibres）

本品粉末：淡紫色或紫褐色。石细胞淡黄色，类圆形、类方形、类长方形、长条形或不规则形，有的一端尖，直径21～96μm，壁厚至39μm，有的层纹明显，纹孔及孔沟明显，有的石细胞形大，壁稍厚。草酸钙针晶多成束存在于薄壁细胞中，针晶长至184μm。具缘纹孔导管淡黄色，直径至105μm，具缘纹孔细密。纤维管胞长梭形，具缘纹孔较大，纹孔口斜缝状或相交成人字形、十字形。(图2)

Powder: Purplish or purplish-brown. Stone cells yellowish, subrounded, subsquare, subrectangular, elongated or irregular-shaped, some tapered at one end, 21～96μm in diameter, walls up to 39μm thick, some with distinct striations, pits and pit-canals, some stone cells large and slightly thick-walled. Needle crystals of calcium oxalate mostly in raphides, up to 184μm long. Bordered pitted vessels pale yellow, up to 105μm in diameter, with fine and dense bordered pits. Fibre tracheids long-fusiform, bordered pits relatively large, pit apertures obliquely slit-shaped, V-shaped or cross-shaped. (Fig 2)



图2　巴戟天（*Morinda officinalis* 根）粉末

[Fig2　Powder of root from *Morinda officinalis*]

1. 石细胞（Stone cells）　2. 草酸钙针晶（Raphides of calcium oxalate）　3. 导管（Vessels）　4. 纤维管胞（Fibre tracheids）

水 飞 蓟

Shuifeiji

FRUCTUS SILYBI

本品为菊科植物水飞蓟*Silybum marianum*（L.）Gaertn. 的干燥成熟果实。

[显微特征]　**本品粉末：**灰褐色。外果皮细胞表面观类长多角形，有的细胞含有色素。中果皮细胞圆柱形或椭圆形，壁具网状纹理。草酸钙柱晶散在。内果皮石细胞表面观宽梭形，层纹不明显。子叶细胞含有细小簇晶和脂肪油滴。（图1）

Powder: Greyish-brown. Cells of exocarp long polygonal in surface view, and some containing pigment. Cells of mesocarp cylindrical or elliptical, with reticulate striations. Prisms of calcium oxalate scattered. Stone cells of endocarp wide fusiform in surface view, and the striations unobvious. Cells of cotyledons containing minute clusters and oil droplets. （Fig 1）

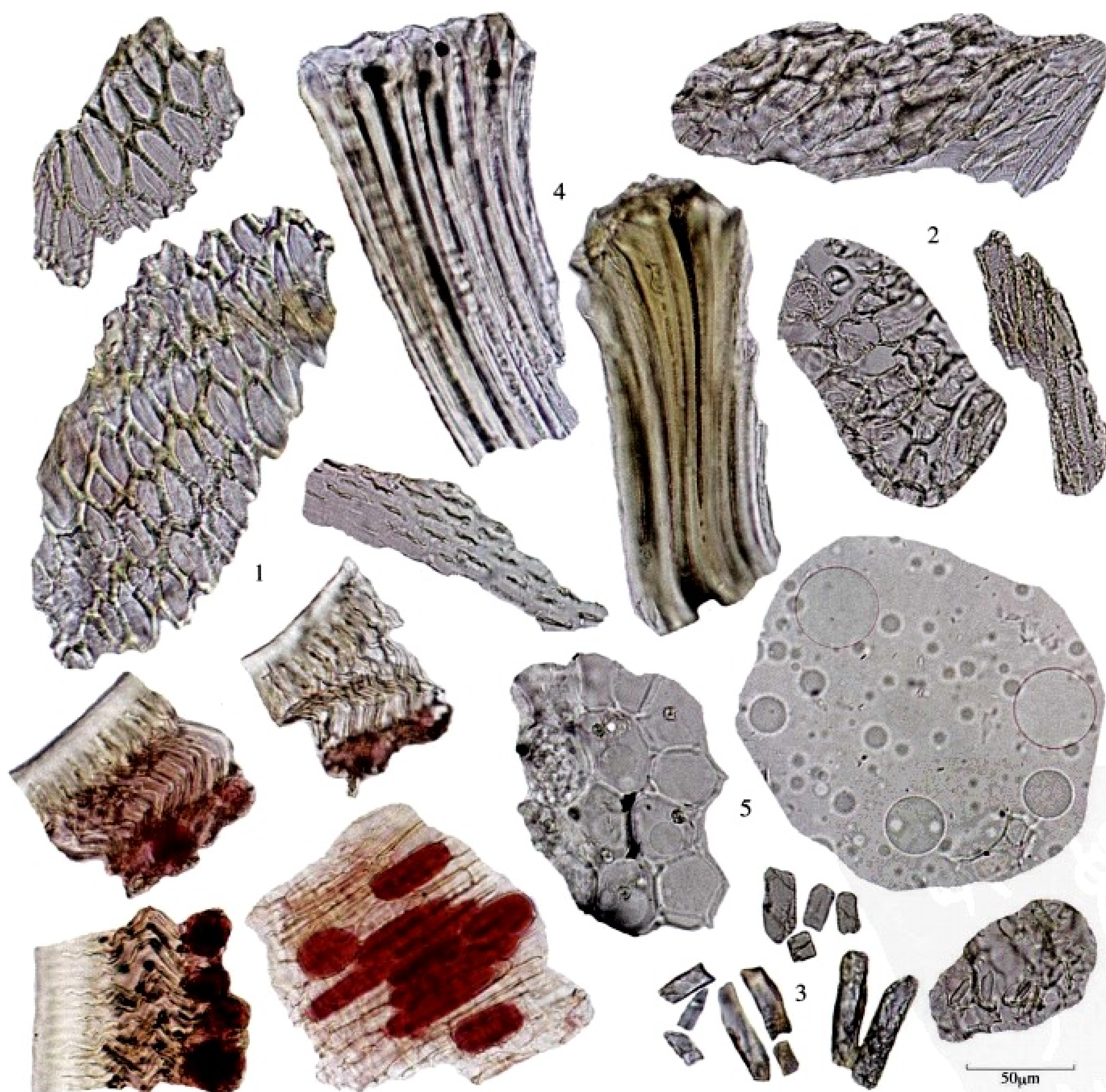


图1　水飞蓟（*Silybum marianum* 果实）粉末

[Fig1　Powder of fruit from *Silybum marianum*]

1. 外果皮细胞（Cells of exocarp）　2. 中果皮细胞（Cells of mesocarp）　3. 草酸钙柱晶（Styloids of calcium oxalate）
4. 内果皮石细胞（Stone cells of endocarp）　5. 子叶细胞（Cells of cotyledon）

水　牛　角

Shuiniujiao

CORNU BUBALI

本品为牛科动物水牛*Bubalus bubalis* Linnaeus的角。

[显微特征]　本品粉末：灰褐色。不规则碎块淡灰白色或灰黄色。纵断面观可见细长梭形纹理，有纵长裂缝，布有微细灰棕色色素颗粒；横断面观梭形纹理平行排列，并弧状弯曲似波峰样，有众多黄棕色色素颗粒。有的碎块表面较平整，色素颗粒及裂隙较小，难于察见。(图1)

Powder: Greyish-brown. Irregular broken pieces pale greyish-white or greyish-yellow. In longitudinal section, slender spindle-shaped striations, longitudinal slits and minute greyish-brown pigment granules visible. In transverse section, spindle-shaped striations parallelly arranged, waved, with many yellowish-brown pigment granules. The surface of some broken pieces relatively even, pigment granules and slits less, poorly visible. (Fig 1)



图1　水牛角（*Bubalus bubalis* 角）粉末

[Fig1　Powder of horn from *Bubalus bubalis*]

1. 纵断面观（Longitudinal section view）　2. 横断面观（Transverse section view）

玉　竹

Yuzhu

RHIZOMA POLYGONATI ODORATI

本品为百合科植物玉竹*Polygonatum odoratum* （Mill.） Druce的干燥根茎。

[显微特征]　**本品横切面**：表皮细胞扁圆形或扁长方形，外壁稍厚，角质化。薄壁组织中散有多数黏液细胞，直径80～140μm，内含草酸钙针晶束。维管束外韧型，稀有周木型，散列。（图1～3）

Transverse section: Epidermal cells oblate or compressed-rectangular, outer walls slightly thickened and cutinized. Numerous mucilage cells scattered throughout parenchyma, 80～140μm in diameter, containing raphides of calcium oxalate. Collateral bundles scattered, a few amphivasal bundles also occasionally present. （Fig 1～3）

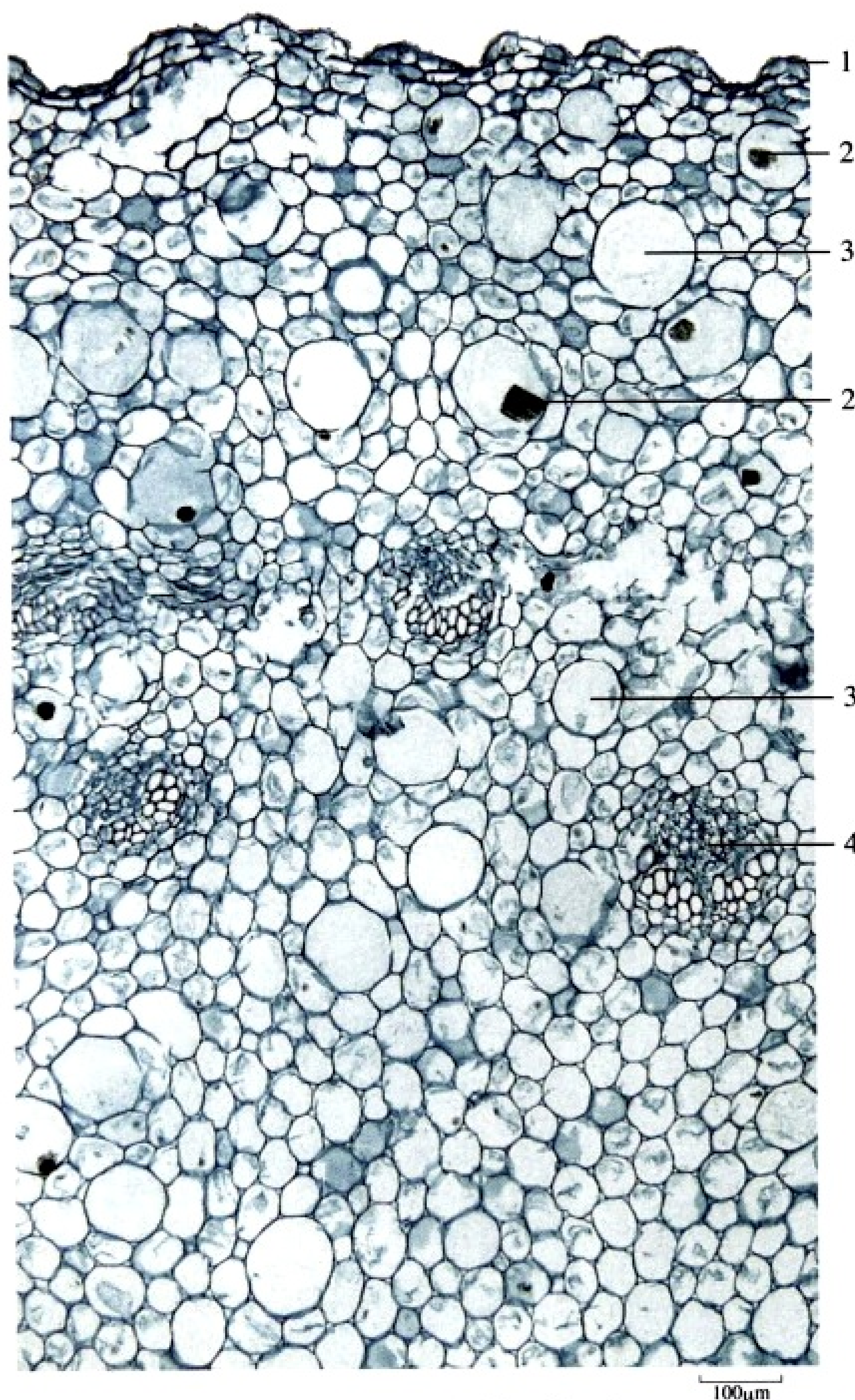


图1　玉竹（*Polygonatum odoratum* 根茎）横切面

[Fig1　Transverse section of rhizome from *Polygonatum odoratum*]

1. 表皮（Epidermis）　2. 草酸钙针晶束（Raphides of calcium oxalate）
3. 黏液细胞（Mucilage cells）　4. 外韧型维管束（Collateral vascular bundle）

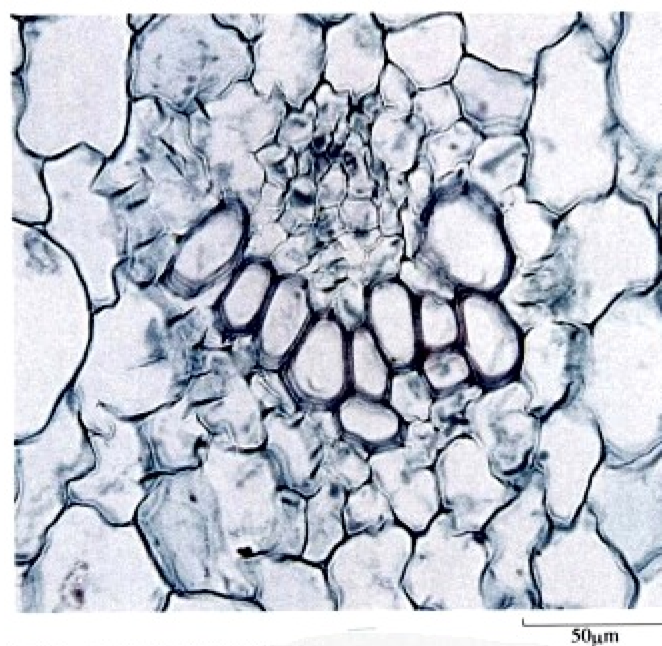


图3　示外韧型维管束

[Fig3　Showing collateral vascular bundle]

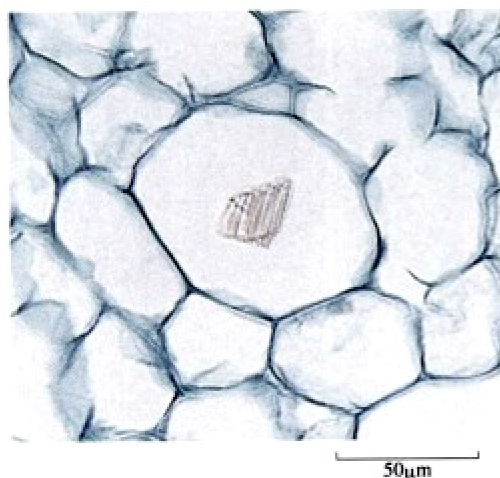


图2　示黏液细胞含草酸钙针晶束

[Fig2　Showing mucilage cell containing raphide of calcium oxalate]

甘 松
Gansong
RADIX ET RHIZOMA NARDOSTACHYOS

本品为败酱科植物甘松*Nardostachys chinensis* Batal. 或匙叶甘松*Nardostachys jatamansi* DC. 的干燥根及根茎。

[显微特征] **本品粉末**：暗棕色。石细胞类圆形或不规则多角形，偶见长条形，单个或成群，直径33～64μm，长可至200μm或更长，壁甚厚，无色，胞腔狭小。梯纹导管或网纹导管，直径7～40μm，小型梯纹导管成束，其旁有时可见细长的木纤维。木栓细胞多为不规则多角形，壁暗棕色，较薄，内含黄色至棕黄色挥发油。基生叶残基碎片较多，细胞呈长方形或长多角形，淡黄色至棕色，直径20～31μm，长50～90μm，壁呈念珠状增厚；另一种碎片细胞呈长条形，长可达200μm，壁有时呈念珠状增厚。(图1)

Powder: Dark brown. Stone cells subrounded or irregularly polygonal, occasionally long slat-shaped, single or grouped, 33～64μm in diameter, 200μm or more long, walls fairly thickened, colourless, lumina narrow. Scalariform or reticulated vessels 7～40μm in diameter, small scalariform vessels in bundles, sometimes accompanied by slender xylem fibres. Cork cells mostly irregularly polygonal, walls dark brown, relatively thin, lumina containing yellow to brownish-yellow volatile oil. Residues of basal leaves numerous, cells rectangular or elongated polygonal, yellowish to brown, 20～31μm in diameter, 50～90μm long, walls beaded and thickened. The cells of another fragments long slat shaped, up to 200μm long, sometimes walls beaded and thickened. (Fig 1)



图1 甘松（*Nardostachys chinensis* 根及根茎）粉末

[Fig1 Powder of the root and rhizome from *Nardostachys chinensis*]

1. 石细胞（Stone cells） 2. 导管（Vessels） 3. 木栓细胞（Cork cells） 4. 基生叶残基碎片[Residue of basal leaf (a. 长方形或长多角形细胞Rectangular or polygonal cells b. 长条形细胞Long stiped cells）]

甘 草

Gancao

RADIX ET RHIZOMA GLYCYRRHIZAE

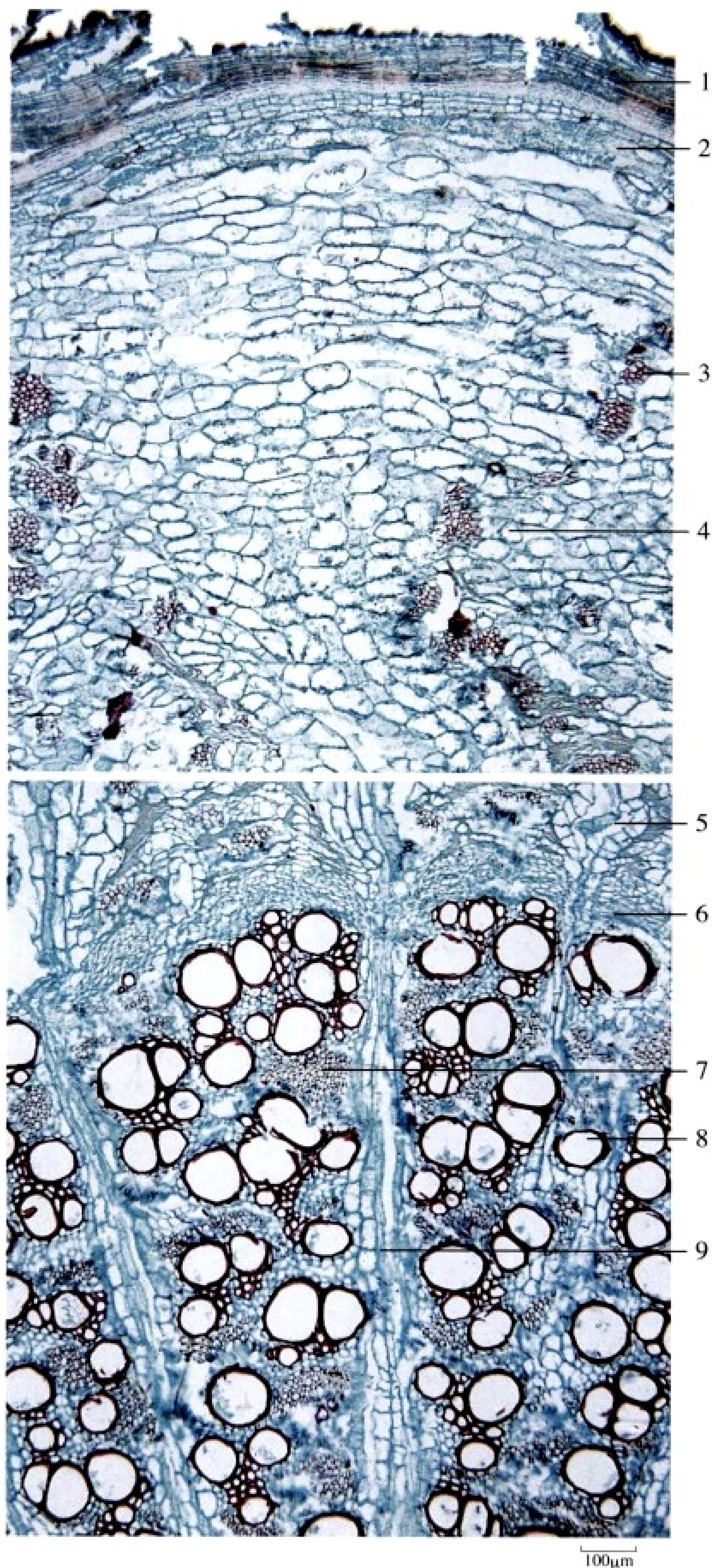


图1 甘草（*Glycyrrhiza uralensis* 根）横切面

[Fig1 Transverse section of root from *Glycyrrhiza uralensis*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 韧皮纤维束（Phloem fibre bundles） 4. 韧皮部（Phloem） 5. 韧皮射线（Phloem rays） 6. 形成层（Cambium） 7. 木纤维束（Xylem fibre bundles） 8. 木质部（Xylem） 9. 木射线（Xylem rays）

本品为豆科植物甘草*Glycyrrhiza uralensis* Fisch.、胀果甘草*Glycyrrhiza inflata* Bat. 或光果甘草*Glycyrrhiza glabra* L. 的干燥根及根茎。

[显微特征]　本品根横切面：木栓层为数列棕色细胞。栓内层较窄。韧皮部射线宽广，多弯曲，常现裂隙；纤维多成束，非木化或微木化，周围薄壁细胞常含草酸钙方晶；筛管群常因压缩而变形。束内形成层明显。木质部射线宽3～5列细胞；导管较多，直径约至160μm；木纤维成束，周围薄壁细胞亦含草酸钙方晶。根中心无髓；根茎中心有髓。（图1、2）

Transverse section: Cork consisting of several layers of brown cells. Phelloderm relatively narrow. Phloem rays broad, mostly curved, frequently with clefts; most phloem fibres in bundles, unlignified or slightly lignified, surrounded by cells containing prisms of calcium oxalate; sieve tube tissue often pressed and collapsed. Fascicular cambium distinct. Xylem rays 3 ~ 5 rows of cells wide; vessels frequent, up to 160μm in diameter; xylem fibres in bundles, surrounded by cells containing prisms of calcium oxalate. Pith visible at the centre of rhizome but not visible at centre of root. (Fig 1, 2)

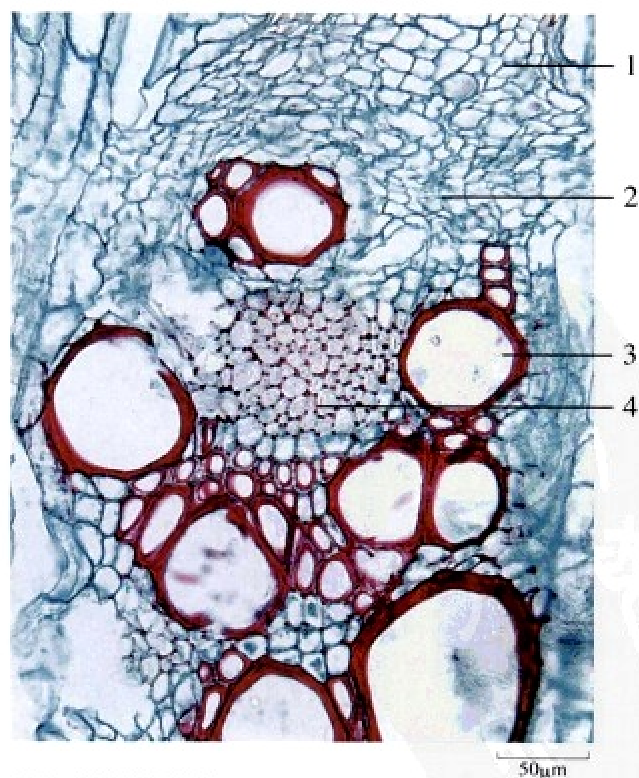


图2 维管束放大

[Fig2 Vascular bundle magnified]

1. 韧皮部（Phloem） 2. 形成层（Cambium） 3. 导管（Vessels） 4. 木纤维束（Xylem fibre bundles）

本品粉末：淡棕黄色。纤维成束，直径8～14μm，壁厚，微木化，周围薄壁细胞含草酸钙方晶，形成晶纤维。草酸钙方晶多见。具缘纹孔导管较大，稀有网纹导管。木栓细胞红棕色，多角形，微木化。（图3）

Powder: Brownish-yellow. Fibres in bundles, 8 ~ 14μm in diameter, thick-walled, slightly lignified, surrounded by cells containing prisms of calcium oxalate, forming crystal fibres. Prisms of calcium oxalate frequent. Bordered pitted vessels large, reticulated vessels rare. Cork cells reddish-brown, polygonal, slightly lignified. (Fig 3)



图3 甘草（*Glycyrrhiza uralensis* 根）粉末
[Fig3 Powder of root from *Glycyrrhiza uralensis*]
1. 晶纤维（Crystal fibres） 2. 草酸钙方晶（Prisms of calcium oxalate）
3. 导管（Vessels） 4. 木栓细胞（Cork cells）

甘　　遂

Gansui

RADIX KANSUI

本品为大戟科植物甘遂*Euphorbia kansui* T. N. Liou ex T. P. Wang的干燥块根。

[显微特征]　本品粉末：类白色。淀粉粒甚多，单粒球形或半球形，直径5～34μm，脐点点状、裂缝状或星状；复粒由2～8分粒组成。无节乳管含淡黄色微细颗粒状物。厚壁细胞长方形、梭形、类三角形或多角形，壁微木化或非木化。具缘纹孔导管多见，常伴有纤维束。(图1)

Powder: Whitish. Starch granules fairly abundant, simple granules spherical or hemispherical, 5 ~ 34μm in diameter, hilum pointed, slit-shaped or stellate; compound granules of 2 ~ 8 components. Non-articulated laticiferous tubes difficult to visible, containing yellowish minute granular substances. Thick-walled cells rectangular, fusiform, subtriangular or polygonal, walls slightly lignified or unlignified. Bordered pitted vessels more frequent, usually accompanied with fibre bundles. (Fig 1)

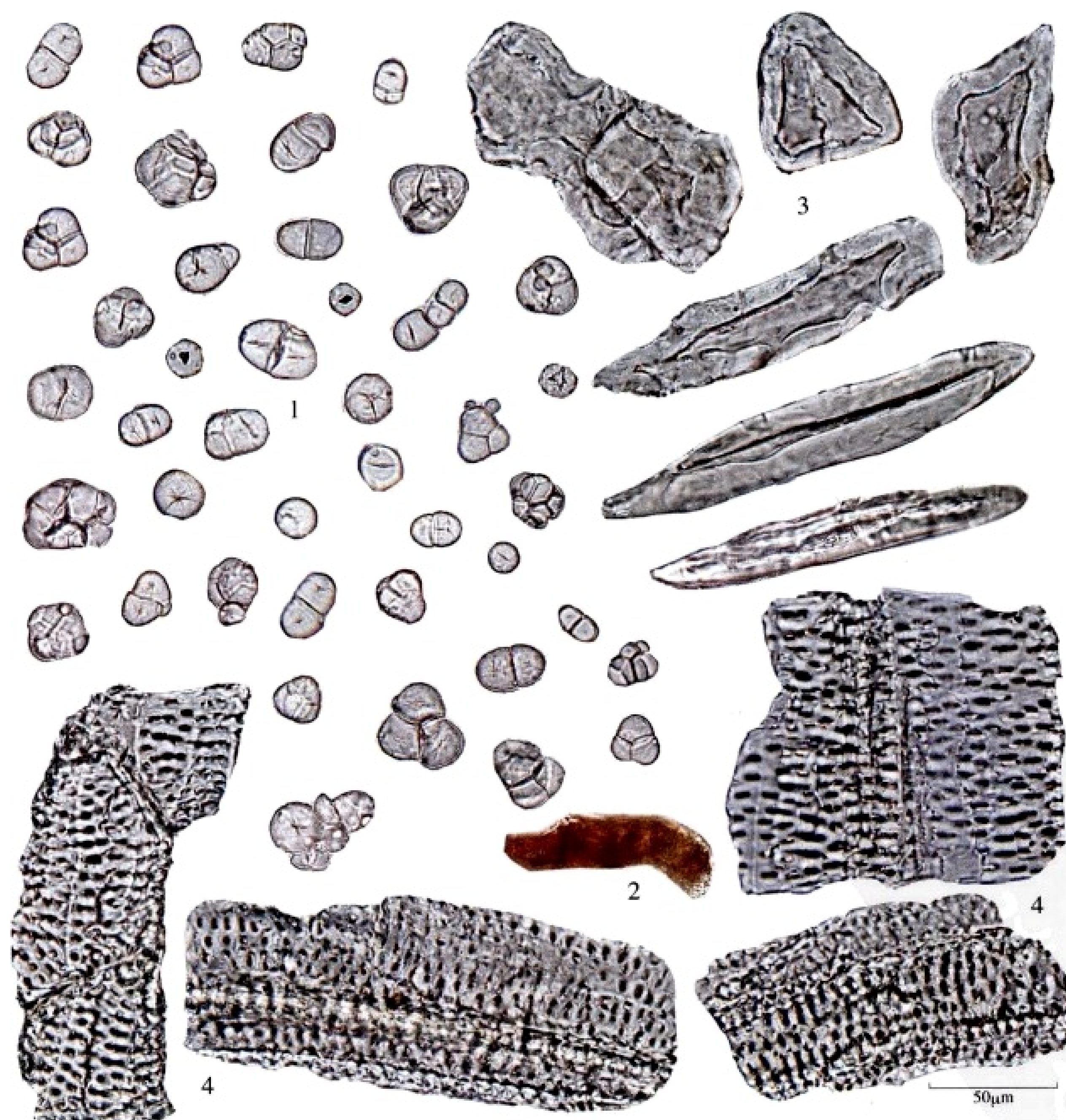


图1　甘遂（*Euphorbia kansui* 块根）粉末

[Fig1　Powder of tuber root of *Euphorbia kansui*]

1. 淀粉粒（Starch granules）　2. 乳汁管（Laticiferous tube）3. 厚壁细胞（Thick-walled cells）

4. 具缘纹孔导管（Bordered pitted vessels）

艾　叶

Aiye

FOLIUM ARTEMISIAE ARGYI

本品为菊科植物艾 *Artemisia argyi* Levl. et Vant. 的干燥叶。

[显微特征]　本品粉末：绿褐色。非腺毛有两种：一种为T形毛，顶端细胞长而弯曲，两臂不等长，柄2～4细胞；另一种为单列性非腺毛，3～5细胞，顶端细胞特长而扭曲，常断落。腺毛表面观鞋底形，由4、6细胞相对叠合而成，无柄。草酸钙簇晶，直径3～7μm，存在于叶肉细胞中。（图1）

Powder: Greenish-brown. Non-glandular hairs occurring in two types: one type T-shaped, with a elongated and bent apical cell, unequally 2-armed and a 2 ～ 4 celled stalk; the other type of uniseriate, 3 ～ 5 celled, with a very long and twisted apical cell, frequently broken. Glandular hairs paramecium-like in surface view, consisting of 4 or 6 oppositely-overlapped cells, devoid of stalk. Clusters of calcium oxalate 3～7μm in diameter, occurring in mesophyll cells.（Fig 1）



图1　艾叶（*Artemisia argyi* 叶）粉末

[Fig1　Powder of leaf from *Artemisia argyi*]

1. 非腺毛[Non-glandular hairs（a. T形毛T-shaped hairs　b. 单列性非腺毛Uniseriate hairs）]

2. 腺毛（Glandular hairs）　3. 草酸钙簇晶（Clusters of calcium oxalate）

石　　韦

Shiwei

FOLIUM PYRROSIAE

本品为水龙骨科植物庐山石韦*Pyrrosia sheareri*（Bak.） Ching、石韦*Pyrrosia lingua* （Thunb.） Farwell 或有柄石韦*Pyrrosia petiolosa* （Christ） Ching 的干燥叶。

[显微特征]　**本品粉末：**黄棕色。星状毛体部7～12细胞，辐射状排列成上、下两轮，每个细胞呈披针形，顶端急尖，有的表面有纵向或不规则网状纹理；柄部1～9细胞。孢子囊环带细胞，表面观扁长方形。孢子极面观椭圆形，赤道面观肾形，外壁具疣状突起。叶下表皮细胞多角形，垂周壁连珠状增厚，气孔类圆形。纤维长梭形，胞腔内充满红棕色或棕色块状物。（图1）

Powder: Yellowish-brown. Stellate hairs each with a 7～12 celled body, showing a radiate arrangement of upper and lower layers, cells lanceolate, apex acute, some with longitudinal or irregular reticulate striations on the surface; and a 1～9 celled stalk. Cells of annular zone of sporangium flattened rectangular in surface view. Spores ellipsoidal in polar view and reniform in equatorial view, with warty walls. Lower epidermal cells of fronds polygonal, with beaded anticlinal walls and subrounded stomata. Fibres long fusiform, filled with reddish-brown or brown masses. （Fig 1）

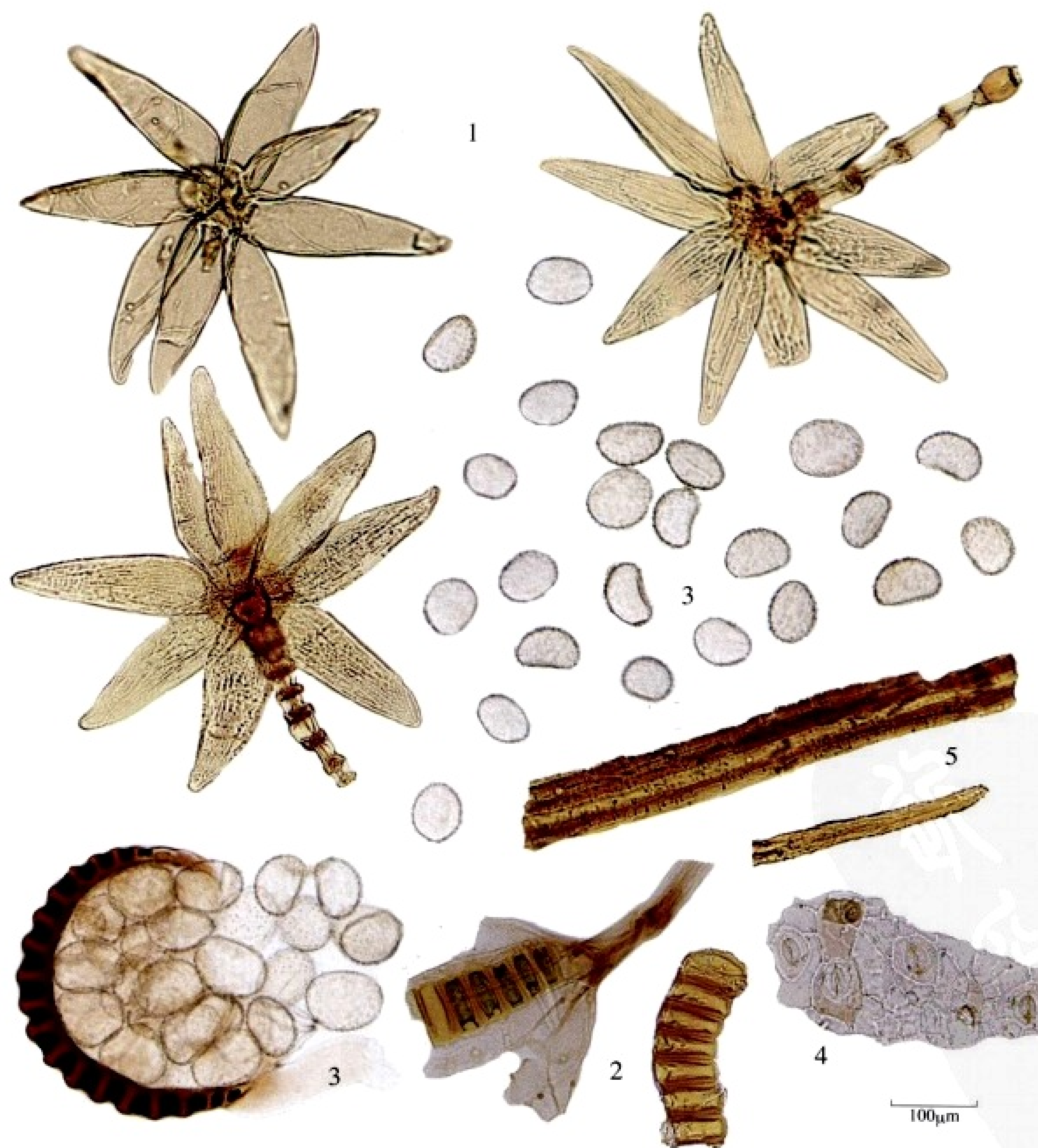


图1　石韦（*Pyrrosia petiolosa* 叶）粉末

[Fig1　Powder of frond from *Pyrrosia petiolosa*]

1. 星状毛（Stellate hairs）　2. 孢子囊环带细胞（Cells of annular zone of sporangium）

3. 孢子（Spores）　4. 叶下表皮细胞（Lower epidermal cells of fronds）　5. 纤维（Fibres）

石 菖 蒲

Shichangpu

RHIZOMA ACORI TATARINOWII

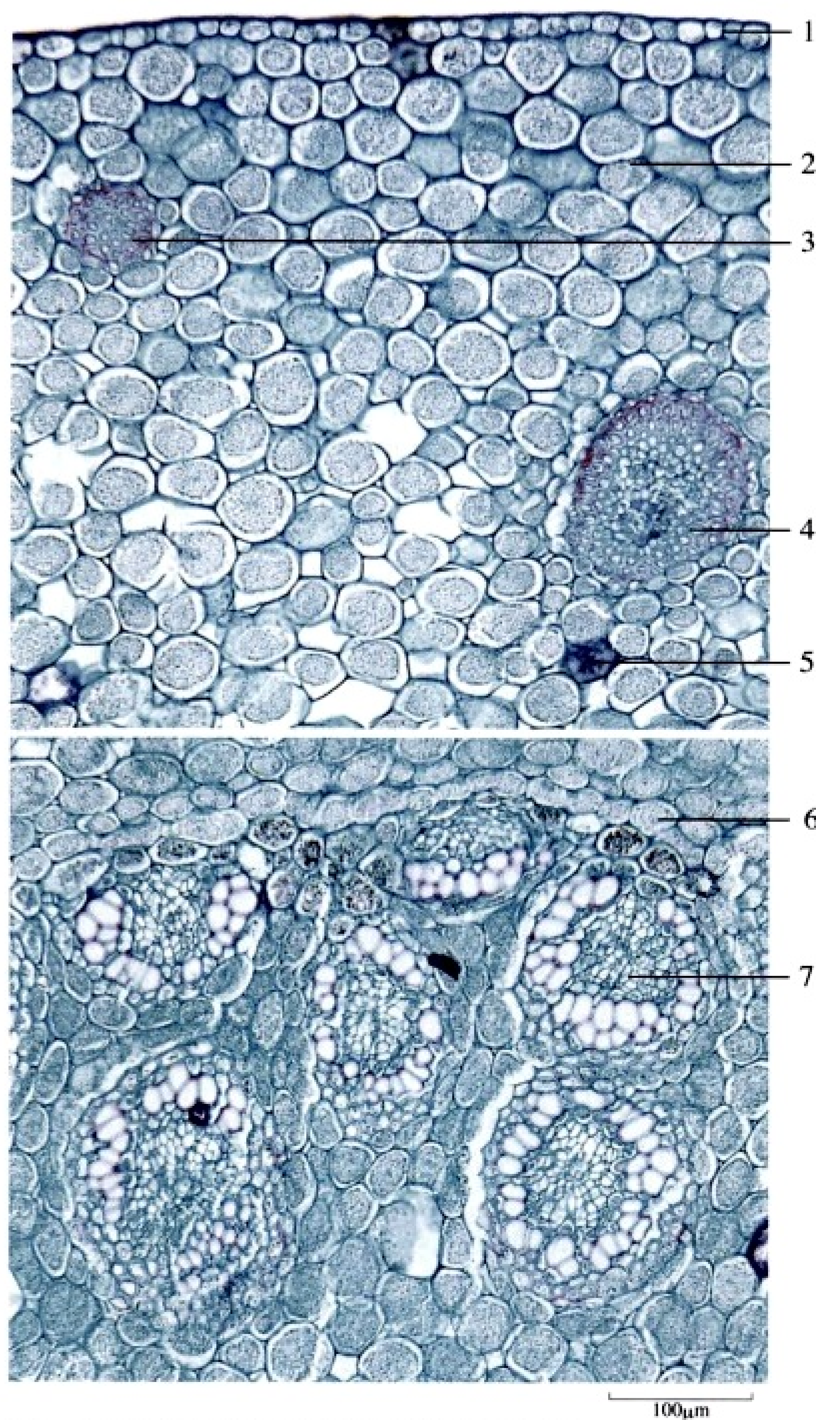


图1 石菖蒲（*Acorus tatarinowii* 根茎）横切面

[Fig1 Transverse section of rhizome from *Acorus tatarinowii*]

1. 表皮（Epidermis） 2. 皮层（Cortex） 3. 纤维束（Fibre bundles） 4. 叶迹维管束（Leaf trace vascular bundles） 5. 油细胞（Oil cells） 6. 内皮层（Endodermis） 7. 中柱维管束（Stele vascular bundles）

本品为天南星科植物石菖蒲*Acorus tatarinowii* Schott的干燥根茎。

[显微特征]　本品横切面：表皮细胞外壁增厚，棕色，有的含红棕色物。皮层宽广，散有纤维束及叶迹维管束；叶迹维管束外韧型，维管束鞘纤维成环，木化；内皮层明显。中柱维管束周木型及外韧型，维管束鞘纤维较少。纤维束及维管束鞘纤维周围细胞中含草酸钙方晶，形成晶纤维。薄壁组织中散有类圆形油细胞；并含淀粉粒。（图1、2）

Transverse section: Epidermal cells with thickened outer walls, brown, some containing reddish-brown contents. Cortex broad, scattered with fibre bundles and collateral leaf trace bundles, and each surrounded by a bundle sheath of lignified fibres, endodermis distinct. Amphivasal or collateral vascular bundles scattered throughout the stele, with less fibrous bundle sheaths. Fibre bundles and bundle sheaths surrounded by cells containing prisms of calcium oxalate, forming crystal fibres. Parenchyma scattered with subrounded oil cells, and containing starch granules. （Fig 1, 2）

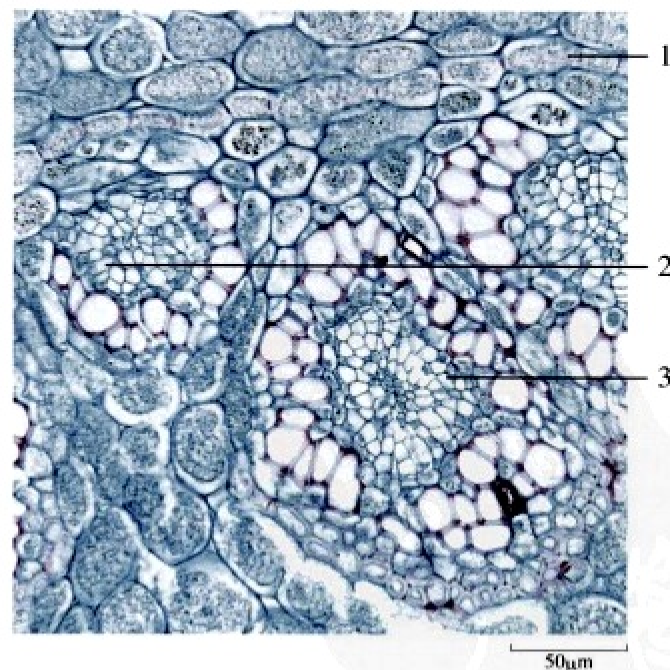


图2 内皮层及中柱维管束放大

[Fig2 Endodermis and stele vascular bundles magnified]

1. 内皮层（Endodermis） 2. 外韧型维管束（Collateral vascular bundle） 3. 周木型维管束（Amphivasal vascular bundle）

石　　斛

Shihu

CAULIS DENDROBII

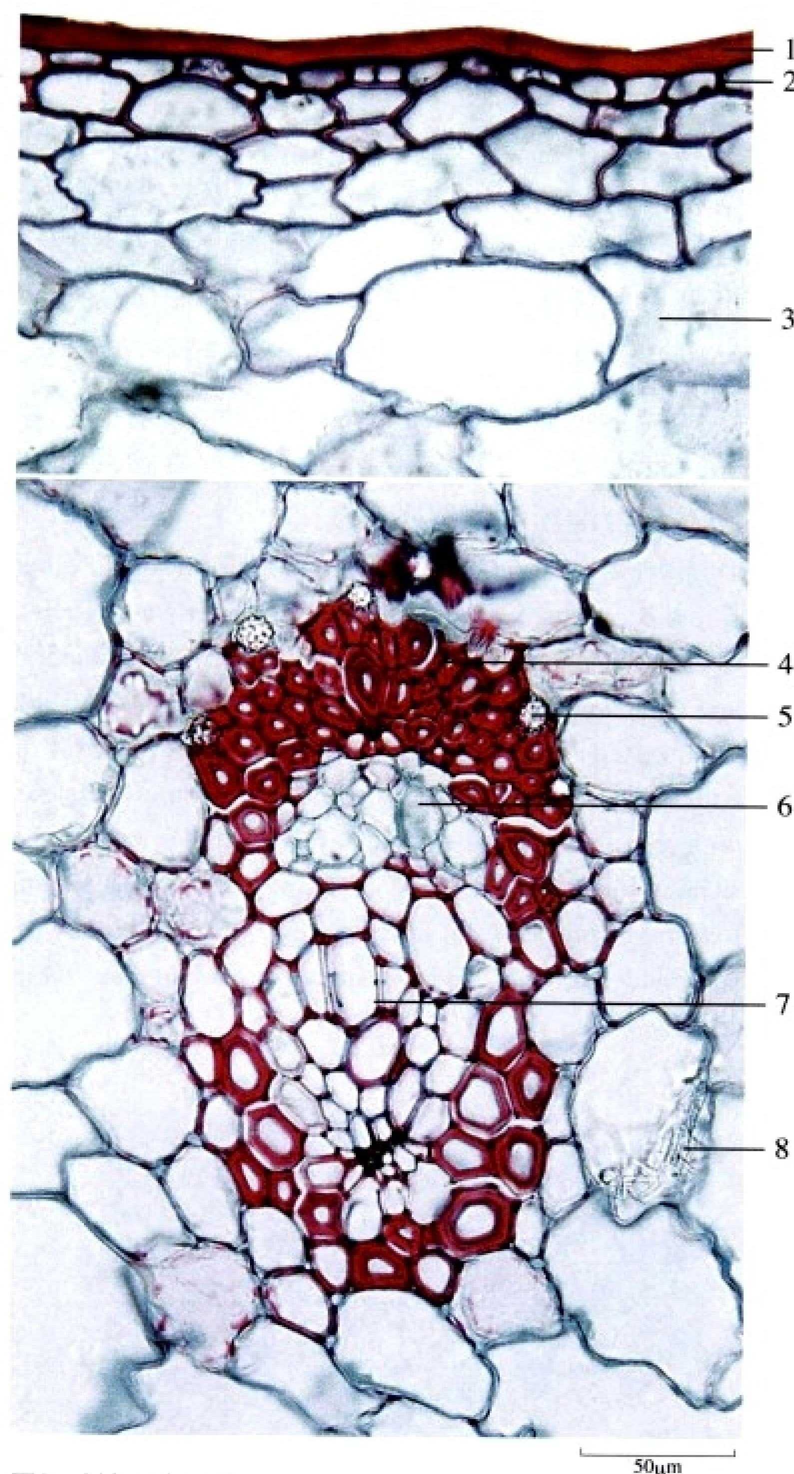


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 角质层（Cuticle）　2. 表皮（Epidermis）　3. 薄壁细胞（Parenchymatous cells）
4. 纤维束（Fibre bundles）　5. 硅质块（Silica body）　6. 韧皮部（Phloem）
7. 木质部（Xylem）　8. 草酸钙针晶（Needle crystals of calcium oxalate）

本品为兰科植物金钗石斛*Dendrobium nobile* Lindl.、铁皮石斛*Dendrobium candidum* Wall. ex Lindl. 或马鞭石斛*Dendrobium fimbriatum* Hook. var. *oculatum* Hook. 及其近似种的新鲜或干燥茎。

[显微特征]　本品横切面：金钗石斛：表皮细胞1列，扁平，外被鲜黄色角质层。基本薄壁组织细胞大小较悬殊，有纹孔，散在多数外韧型维管束，排成7～8圈。维管束外侧纤维束新月形或半月形，其外侧薄壁细胞有的含类圆形硅质块，木质部有1～3个导管直径较大。含草酸钙针晶细胞多见于维管束旁。（图1、2）

Transverse section of stem *Dendrobium nobile:* Epidermal cells of 1 layer, flattened, covered with bright yellow cuticle. Parenchymatous cells varying distinctly in size, with pitted walls, scattered with numerous collateral vascular bundles, somewhat arranged in 7 ~ 8 whorls. Fibre bundles at the outer side of vascular bundles crescent or semicircular, some parenchymatous cells at the outer part containing subrounded silica bodies, xylem with 1 ~ 3 relatively large vessels. Most of cells containing needle crystals of calcium oxalate beside vascular bundles. (Fig 1, 2)

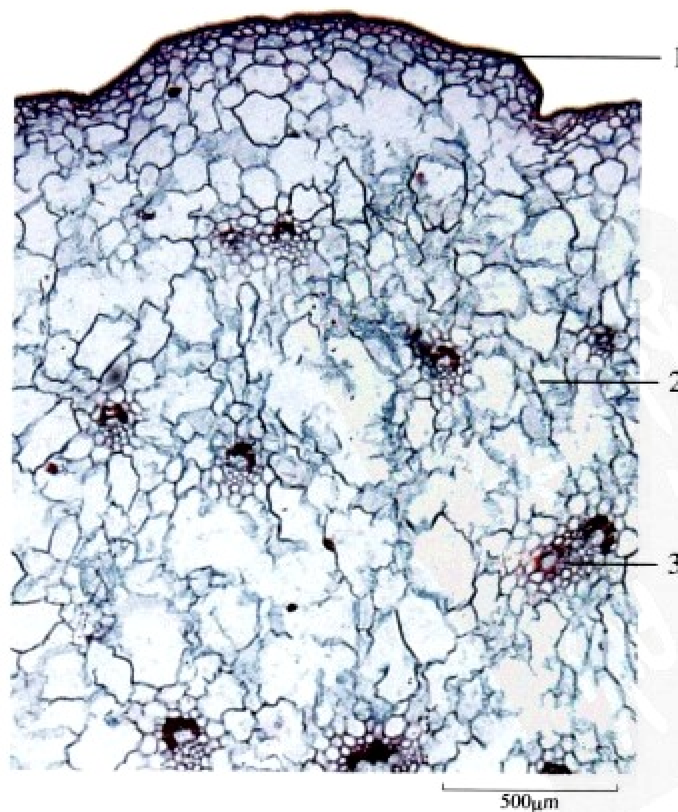


图1　石斛（*Dendrobium nobile* 茎）横切面

[Fig1　Transverse section of stem from *Dendrobium nobile*]

1. 表皮（Epidermis）　2. 基本薄壁组织（Elementary parenchyma）
3. 维管束（Vascular bundles）

铁皮石斛：表皮细胞外壁及侧壁稍增厚，微木化。维管束略排成4～5圈，外侧小型薄壁细胞中有的含硅质块。含草酸钙针晶束细胞多见于近表皮处。(图3)

Dendrobium candidum: Outer walls and lateral walls of epidermal cells slightly thickened and faintly lignified. Vascular bundles somewhat arranged in 4～5 whorls, small parenchymatous cells at the outer part containing silica bodies. Most of cells containing needle crystals of calcium oxalate occurring near the epidermis. (Fig 3)

马鞭石斛：表皮细胞扁圆形，外壁及侧壁增厚，木化，有层纹。基本组织细胞大小相近，有纹孔，维管束略排成3～4圈。(图4)

Dendrobium fimbriatum var. *oculatum:* Epidermal cells flattened rounded, outer and lateral walls thickened, lignified and striated. Parenchymatous cells similar in size, with pitted walls; vascular bundles arranged in 3～4 whorls. (Fig 4)

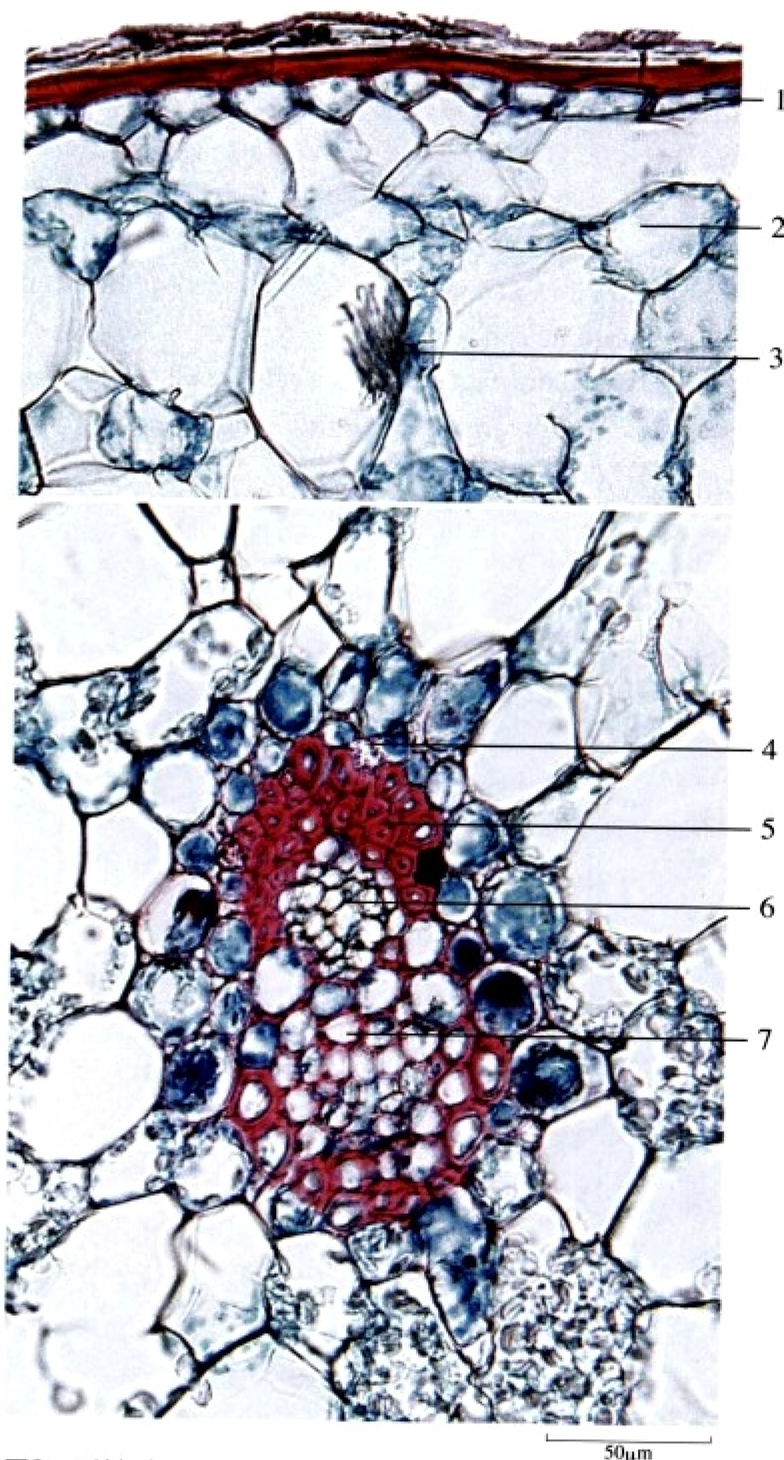


图3 石斛（*Dendrobium candidum* 茎）横切面

[Fig3 Transverse section of stem from *Dendrobium candidum*]

1. 表皮（Epidermis） 2. 薄壁细胞（Parenchymatous cells） 3. 草酸钙针晶（Needle crystals of calcium oxalate） 4. 硅质块（Silica body） 5. 纤维束（Fibre bundles） 6. 韧皮部（Phloem） 7. 木质部（Xylem）

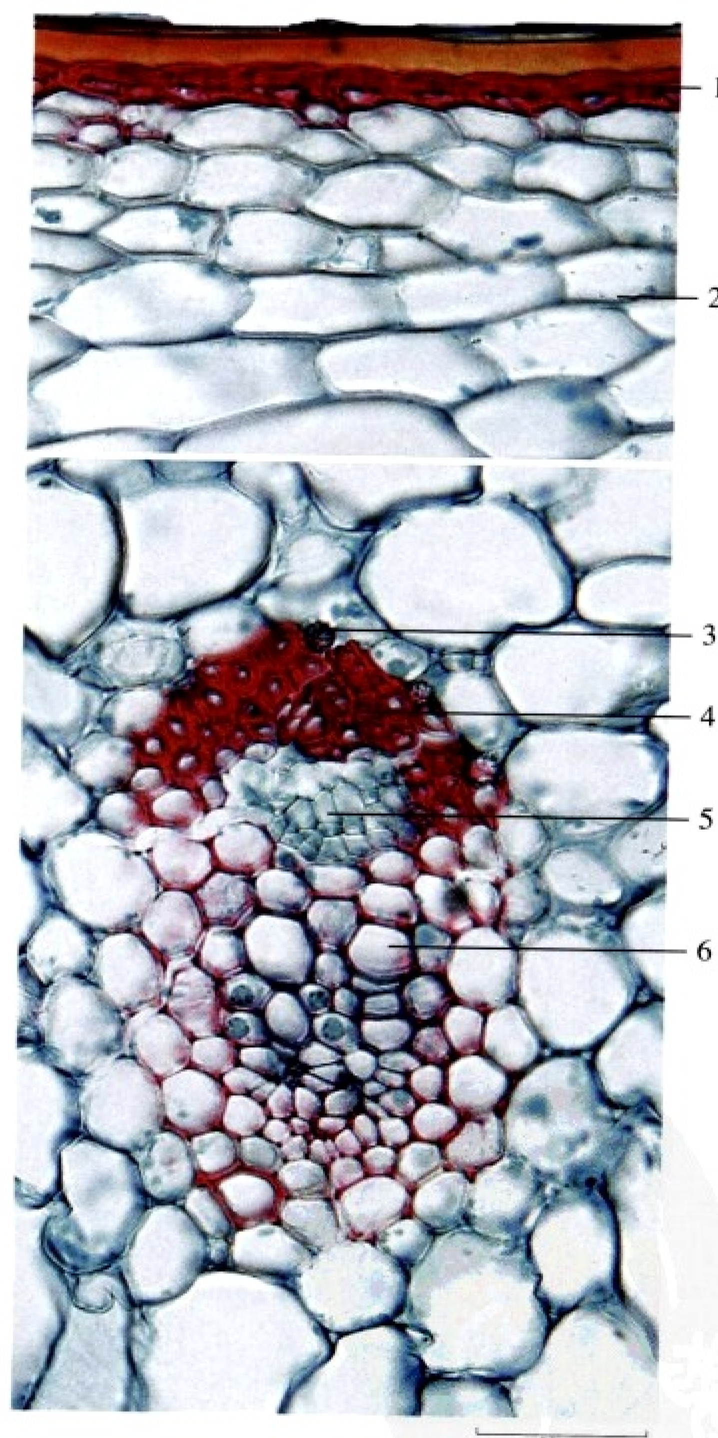


图4 石斛（*Dendrobium fimbriatum* var. *oculatum* 茎）横切面

[Fig4 Transverse section of stem from *Dendrobium fimbriatum* var. *oculatum*]

1. 表皮（Epidermis） 2. 薄壁细胞（Parenchymatous cells） 3. 硅质块（Silica body） 4. 纤维束（Fibre bundles） 5. 韧皮部（Phloem） 6. 木质部（Xylem）

石　榴　皮

Shiliupi

PERICARPIUM GRANATI

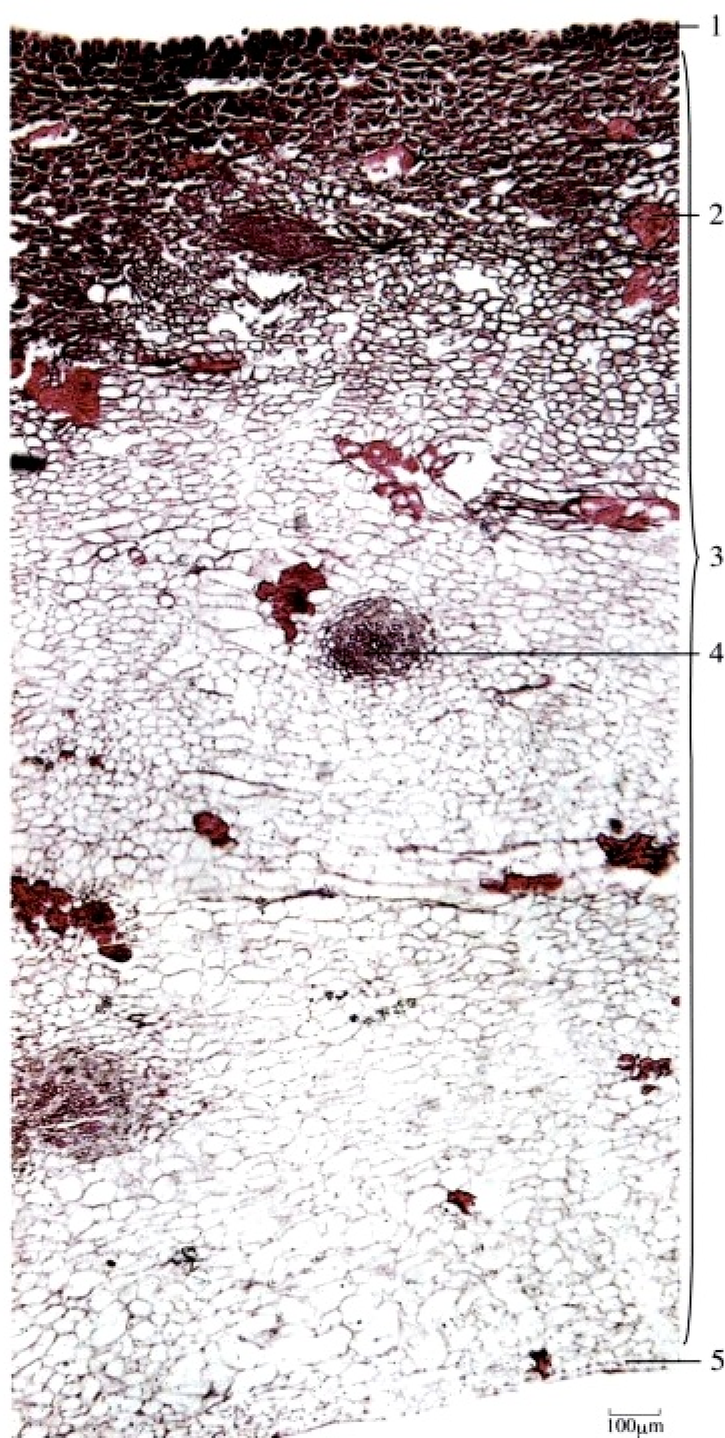


图1　石榴（*Punica granatum* 果皮）横切面

[Fig1　Transverse section of pericarp from *Punica granatum*]

1. 外果皮（Exocarp）　2. 石细胞（Stone cells）　3. 中果皮（Mesocarp）
4. 维管束（Vascular bundles）　5. 内果皮（Endocarp）

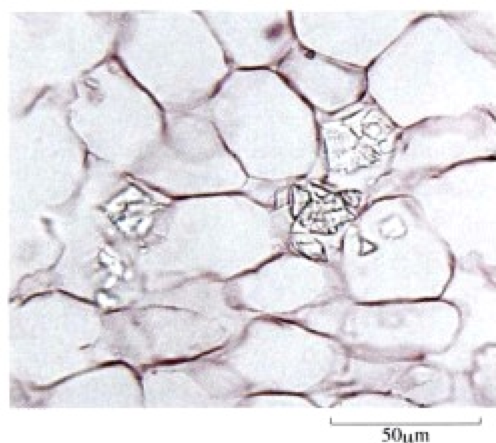


图3　示草酸钙簇晶

[Fig3　Showing clusters of calcium oxalate]

本品为石榴科植物石榴*Punica granatum* L. 的干燥果皮。

[显微特征]　**本品横切面**：外果皮为1列表皮细胞，排列较紧密，外被角质层。中果皮较厚，薄壁细胞内含淀粉粒及草酸钙簇晶或方晶；石细胞单个散在，类圆形、长方形或不规则形，少数呈分枝状，壁较厚；维管束散在。内果皮薄壁细胞较小，亦含淀粉粒及草酸钙晶体，石细胞较小。（图1～3）

Transverse section: Exocarp cells 1 layer, arranged relatively compact, covered with cuticle. Mesocarp slightly thick, parenchymatous cells containing starch granules and clusters or prisms of calcium oxalate; stone cells single, subrounded, rectangular or irregular, and rarely branched, walls thick; vascular bundles scattered. Endocarp cells relatively small, containing starch granules and crystals of calcium oxalate, stone cells relatively small. (Fig 1～3)

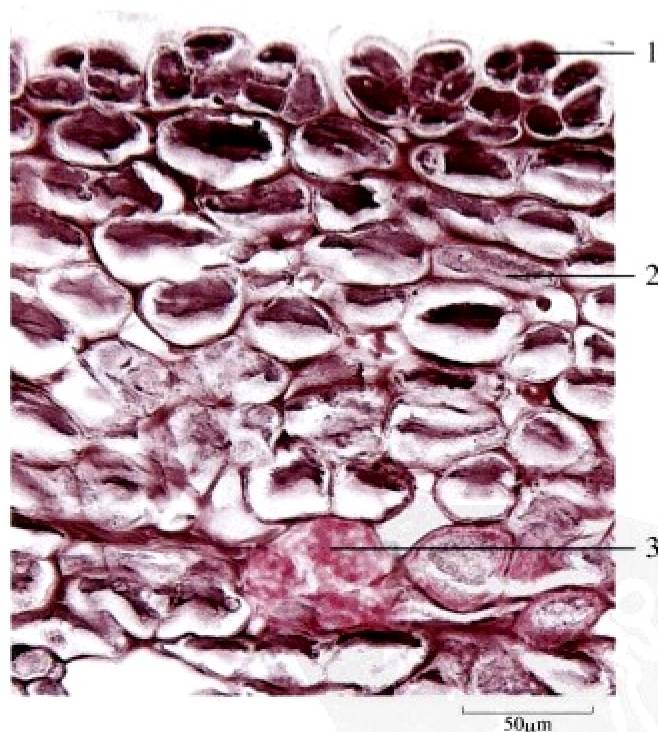


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 外果皮细胞（Exocarp cells）2. 中果皮细胞（Mesocarp cells）
3. 石细胞（Stone cells）

本品粉末：红棕色。石细胞类圆形、长方形或不规则形，少数分枝状，直径27～102μm，壁较厚，孔沟细密，胞腔大，有的含棕色物。表皮细胞类方形或类长方形，壁略厚。草酸钙簇晶直径10～25μm，稀有方晶。螺纹导管及网纹导管直径12～18μm。淀粉粒类圆形，直径2～10μm。(图4)

Powder: Reddish-brown. Stone cells subrounded, rectangular or irregular, rarely branched, 27～102μm in diameter, thick-walled with fine and close pit canals, lumina large, some containing brown contents. Epidermal cells subsquare or subrectangular, with slightly thickened walls. Clusters of calcium oxalate 10～25μm in diameter, prisms infrequent. Spiral and reticulate vessels 12～18μm in diameter. Starch granules subrounded, 2～10μm in diameter. (Fig 4)



图4　石榴皮（*Punica granatum* 果皮）粉末

[Fig4　Powder of pericarp of *Punica granatum*]

1. 石细胞（Stone cells）　2. 表皮细胞（Epidermal cells）　3. 草酸钙簇晶（Clusters of calcium oxalate）
4. 草酸钙方晶（Prisms of calcium oxalate）　5. 导管（Vessels）　6. 淀粉粒（Starch granules）

龙　胆
Longdan
RADIX ET RHIZOMA GENTIANAE

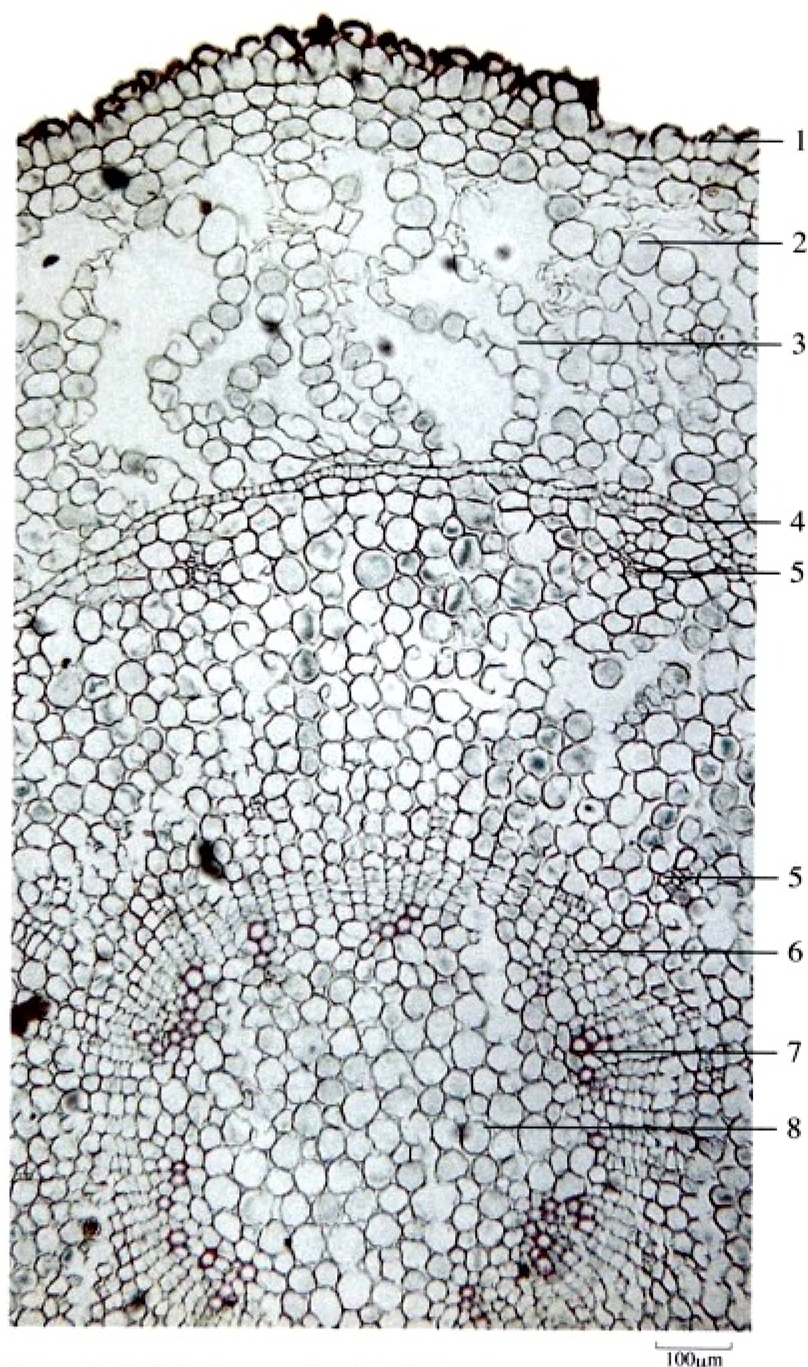


图1　龙胆（*Gentiana scabra* 根）横切面

[Fig1　Transverse section of root from *Gentiana scabra*]

1. 外皮层（Exodermis）　2. 皮层（Cortex）　3. 裂隙（Clefts）　4. 内皮层（Endodermis）　5. 韧皮部（Phloem）　6. 形成层（Cambium）　7. 木质部（Xylem）　8. 髓（Pith）

本品为龙胆科植物条叶龙胆*Gentiana manshurica* Kitag.、龙胆*Gentiana scabra* Bge.、三花龙胆*Gentiana triflora* Pall. 或坚龙胆*Gentiana rigescens* Franch. 的干燥根及根茎。

[显微特征]　**本品根横切面：龙胆**　表皮细胞有时残存，外壁较厚。皮层窄；外皮层细胞类方形，壁稍厚，木栓化；内皮层细胞切向延长，每一细胞由纵向壁分隔成数个类方形小细胞。韧皮部宽广，有裂隙。形成层不甚明显。木质部导管3～10个群束。髓部明显。薄壁细胞含细小草酸钙针晶。（图1、2）

Transverse section:

Longdan: Epidermal cells sometimes found, the outer walls relatively thick. Cortex narrow; cells of exodermis subsquare, walls slightly thick, suberized; endodermal cells elongated tangentially, each cell divided by longitudinal walls into several subsquare small cells. Phloem broad and cleft. Cambium less distinct. Vessels grouped into 3 ~ 10. Pith distinct. Parenchymatous cells containing minute needles of calcium oxalate. (Fig 1, 2)

坚龙胆　内皮层以外组织多已脱落。木质部导管发达，均匀密布。无髓部。

Jianlongdan: The tissues outside the endodermis mostly falling off. Vessels in xylem well developed and evenly and densely distributed. Pith absent.

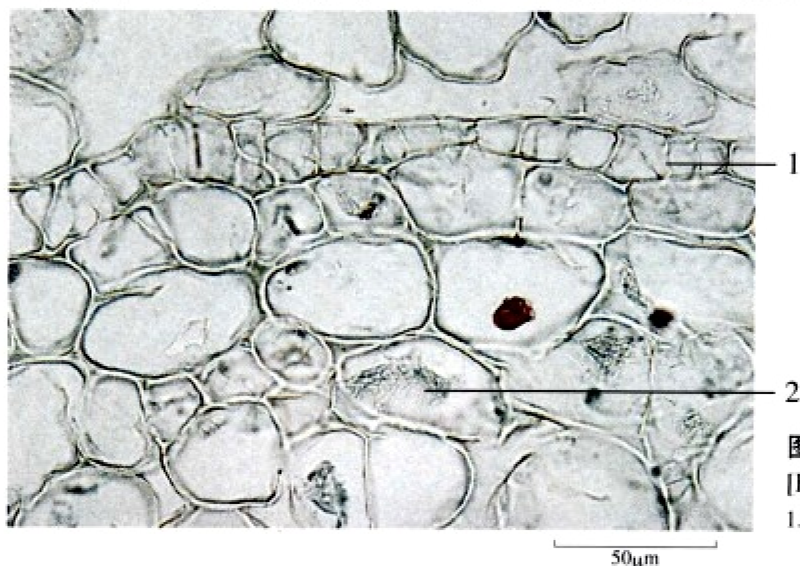


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 内皮层细胞（Endodermis cells）　2. 草酸钙针晶（Needles of calcium oxalate）

本品粉末：龙胆 淡黄棕色。龙胆外皮层细胞表面观类纺锤形，每一细胞由横壁分隔成数个扁方形的小细胞。内皮层细胞表面观类长方形，甚大，平周壁显纤细的横向纹理，每一细胞由纵隔壁分隔成数个栅状小细胞，纵隔壁大多连珠状增厚。薄壁细胞含细小草酸钙针晶。网纹导管及梯纹导管直径约至45μm。（图3）

Powder: Yellowish-brown.

Longdan: Exodermal cells of spindle-shaped in surface view, each cell divided by transverse walls into several small rectangular cells. Endodermal cells of subrectangular in surface view, fairly large, periclinal walls showing minute transverse striations, each cell divided by longitudinal septa walls into several small palisade-like cells, mostly longitudinal septa beaded. Parenchymatous cells containing minute needle crystals of calcium oxalate. Reticulated and scalariform vessels up to about 45μm in diameter. （Fig 3）



图3 龙胆（*Gentiana scabra* 根及根茎）粉末

[Fig3 Powder of root and rhizome from *Gentiana scabra*]

1. 外皮层细胞（Exodermis cells） 2. 内皮层细胞（Endodermis cells） 3. 草酸钙针晶（Needles of calcium oxalate）
4. 导管（Vessels）



坚龙胆　无外皮层细胞。内皮层细胞类方形或类长方形，平周壁的横向纹理较粗而密，有的粗达3μm，每一细胞分隔成多数栅状小细胞，隔壁稍增厚或呈连珠状。(图4)

Jianlongdan: Exodermis absent. Endodermal cells subsquare or subrectangular, transverse striations of the periclinal walls relatively thick and dense, some up to 3μm thick, each cell divided into several small palisade-like cells, septa slightly thickened or beaded. (Fig 4)



图4　坚龙胆（*Gentiana rigescens* 根及根茎）粉末

[Fig4　Endodermal cells of root and rhizome from *Gentiana rigescens*]

龙 眼 肉
Longyanrou
ARILLUS LONGAN

本品为无患子科植物龙眼*Dimocarpus longan* Lour. 的假种皮。

[鉴别]　本品横切面：外表皮细胞1列，呈类方形。内表皮细胞1列，壁稍厚，外被较厚的角质层。内外表皮间为多列大型条状薄壁细胞，直径约148μm。有的细胞中含淡黄色团块及脂肪油滴。（图1、2）

Transverse section: Outer epidermal cells 1 layer, subsquare. Inner epidermal cells 1 layer, walls slightly thickened, and covered with a relatively thickened cuticle. Parenchymatous cells between outer and inner epidermis large, cylindrical, in several rows, 148μm in diameter. Some of the parenchymatous cells containing pale yellow masses and oil droplets. (Fig 1, 2)

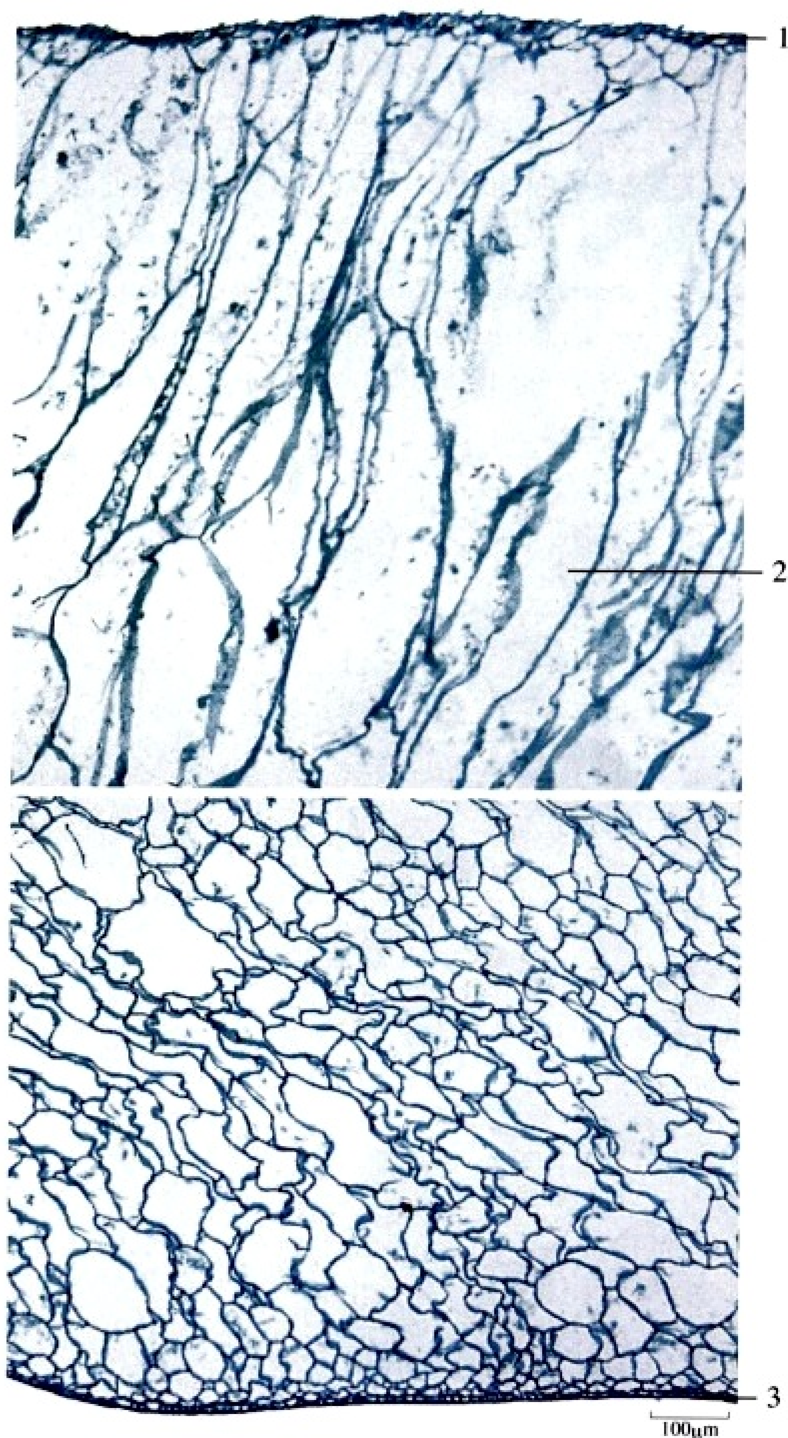


图1　龙眼肉（*Dimocarpus longan* 假种皮） 横切面

[Fig1　Transverse section of aril from *Dimocarpus longan*]

1. 外表皮细胞（Outer epidermal cells）　2. 薄壁细胞（Parenchymatous cells）

3. 内表皮细胞（Inner epidermal cells）

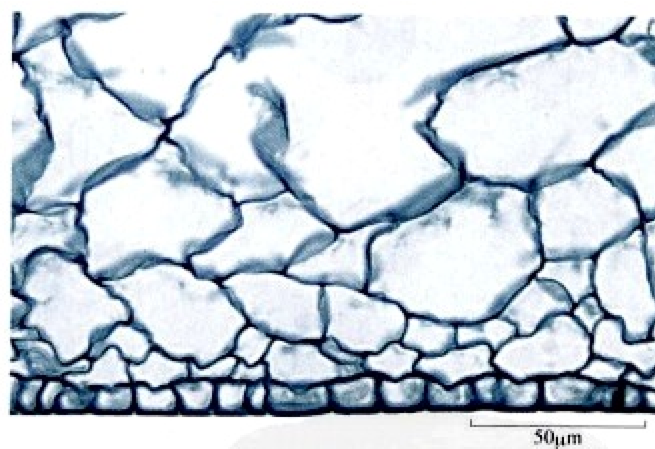


图2　示内表皮细胞

[Fig2　Showing inner epidermal cells]

平 贝 母

Pingbeimu

BULBUS FRITILLARIAE USSURIENSIS

本品为百合科植物平贝母*Fritillaria ussuriensis* Maxim. 的干燥鳞茎。

[显微特征] **本品粉末**：类白色。淀粉粒单粒多为圆三角形、卵形、圆贝壳形、三角状卵形、长茧形，直径6～58（74）μm，长约至67μm，脐点裂缝状、点状或人字状，多位于较小端，层纹细密；半复粒稀少，脐点2个；多脐点单粒可见，脐点2～4个。气孔类圆形或扁圆形，直径40～48（50）μm，副卫细胞4～6个。（图1）

Powder: Whitish. Starch granules simple, rounded triangular, ovoid, rounded-conchoidal, triangular-ovoid, long-cocooned, 6～58（74）μm in diameter, up to 67μm long, hilum cleft-like, pointed or V-shaped in the smaller end, striations dense and distinct. Semi-compound granules few, hila 2; simple granules with multihila visible occasionally, hila 2～4. Stomata subrounded or depressed rounded, 40～48（50）μm in diameter, with 4～6 subsidiary cells. （Fig1）

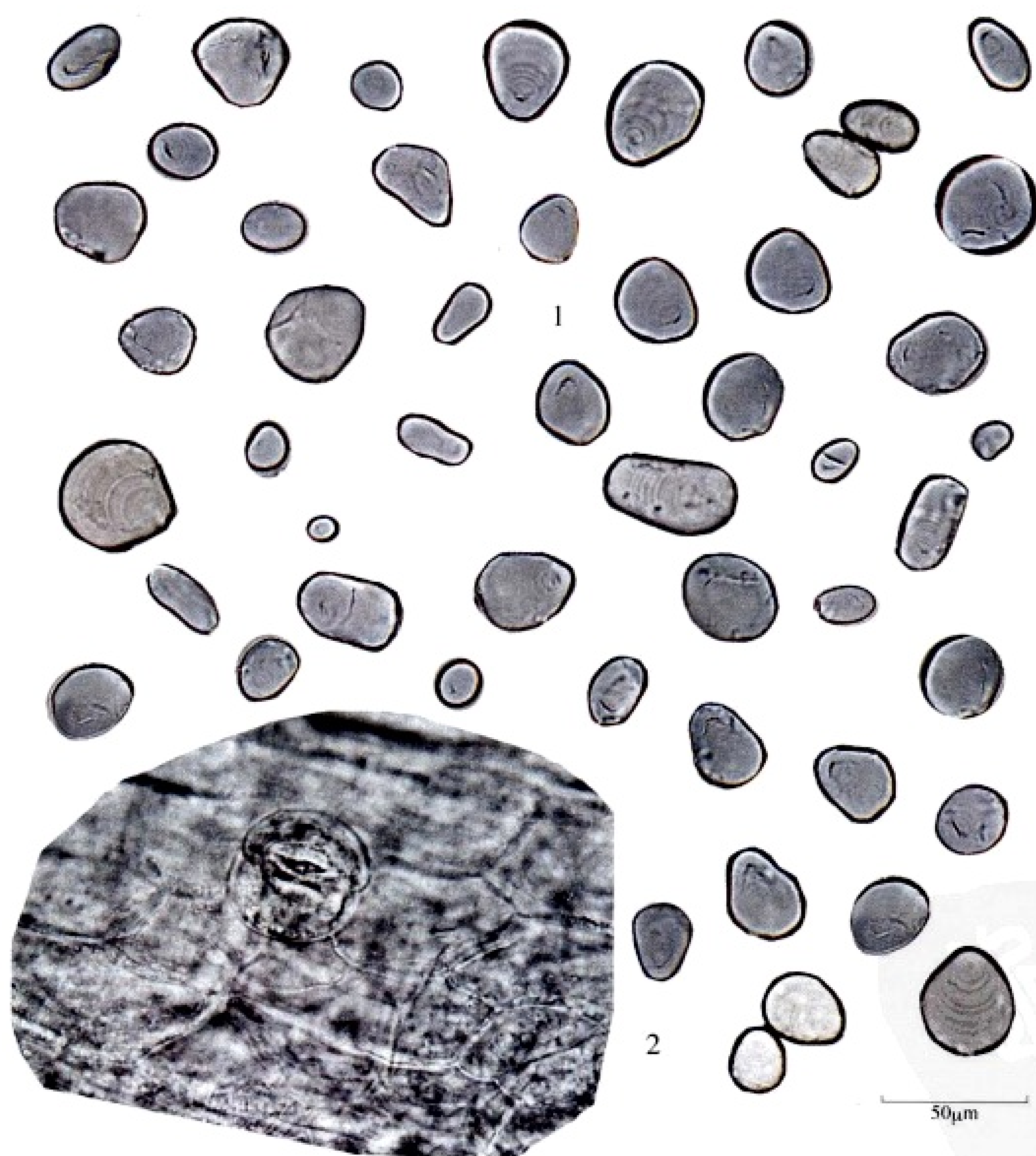


图1 平贝母（*Fritillaria ussuriensis* 鳞茎）粉末
[Fig1 Powder of bulb from *Fritillaria ussuriensis*]
1. 淀粉粒（Starch granules） 2. 气孔（Stomata）

北　豆　根

Beidougen

RHIZOMA MENISPERMI

本品为防己科植物蝙蝠葛 *Menispermum dauricum* DC. 的干燥根茎。

[显微特征]　本品横切面： 表皮细胞1列，外被棕黄色角质层。木栓层为数列细胞。皮层较宽，老的根茎有石细胞散在。中柱鞘纤维排列成新月形。维管束外韧型，环列。束间形成层不明显。木质部由导管、管胞、木纤维及木薄壁细胞组成，均木化。中央有髓。薄壁细胞含淀粉粒及细小草酸钙结晶。（图1、2）

Transverse section: Epidermal cells 1 layer, covered with brownish-yellow cuticle outside. Cork consisting of several layers of cells. Cortex relatively broad, scattered with stone cells in the old rhizome. Pericyclic fibres arranged to be crescent. Vascular bundles collateral, ringed. Interfascicular cambium indistinct. Xylem consisting of vessels, tracheids, wood fibres and parenchymatous cells, all of them lignified. Medullated. Parenchymatous cells containing starch granules and minute crystals of calcium oxalate. (Fig 1, 2)

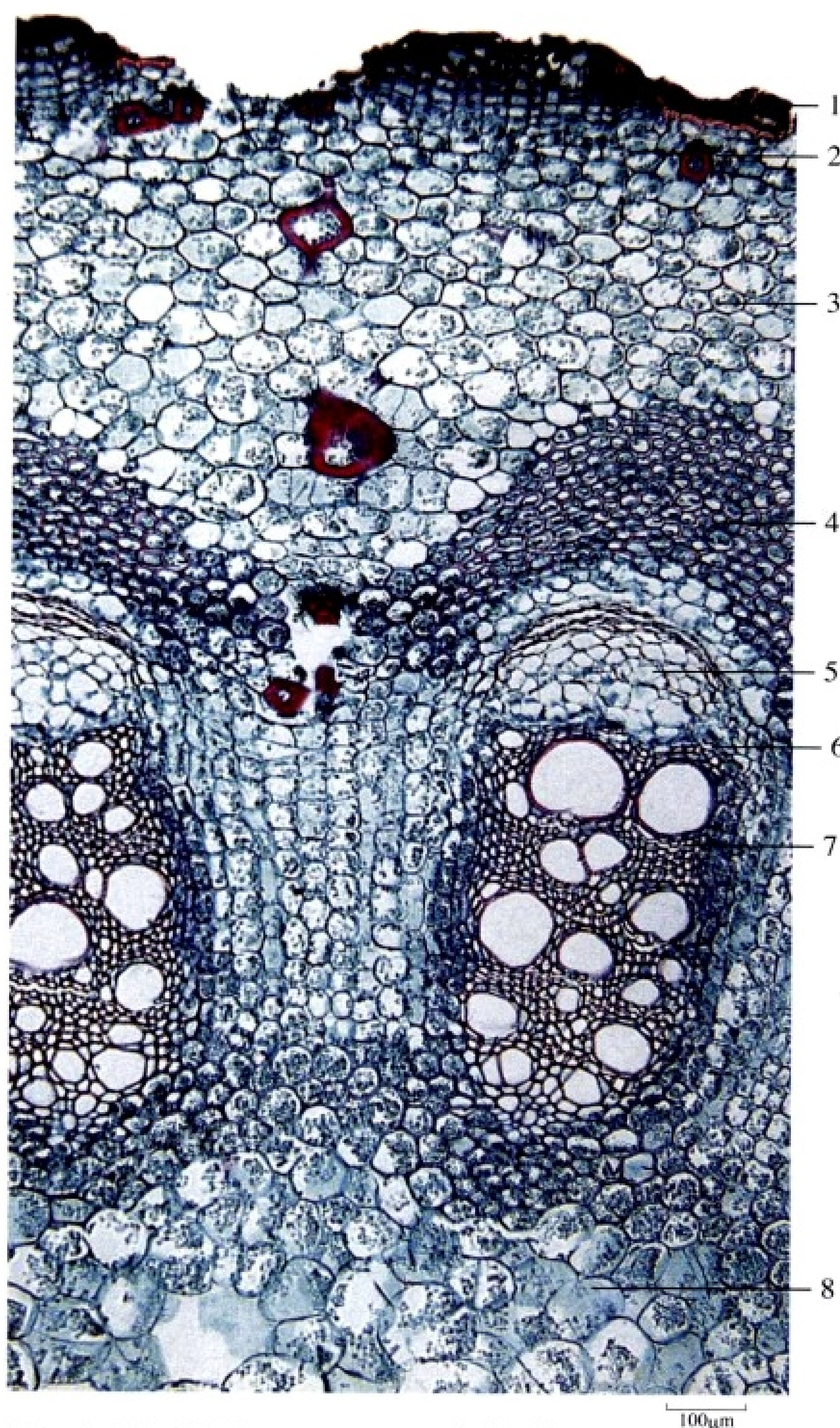


图1　北豆根（*Menispermum dauricum* 根茎）横切面

[Fig1　Transverse section of rhizome from *Menispermum dauricum*]

1. 木栓层（Cork）　2. 石细胞（Stone cells）　3. 皮层（Cortex）　4. 中柱鞘纤维（Pericyclic fibres）　5. 韧皮部（Phloem）　6. 形成层（Cambium）　7. 木质部（Xylem）　8. 髓（Pith）

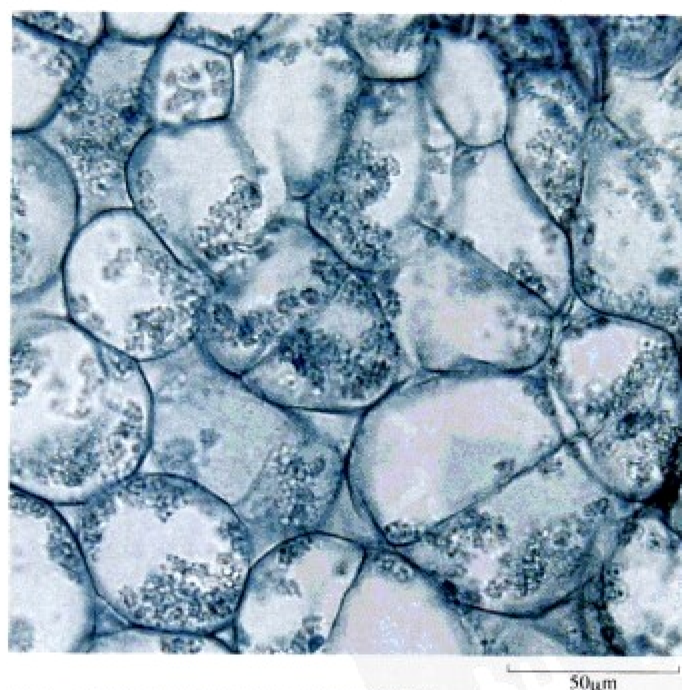


图2　示薄壁细胞含细小草酸钙结晶

[Fig2　Showing parenchymatous cells containing minute crystals of calcium oxalate]

本品粉末：淡棕黄色。石细胞单个散在，淡黄色，分枝状或不规则形，直径43～147（200）μm，胞腔较大。中柱鞘纤维多成束，淡黄色，直径18～34μm，常具分隔。木纤维成束，直径10～26μm，壁具斜纹孔或交叉纹孔。具缘纹孔导管。草酸钙结晶细小。淀粉粒单粒直径约3～12μm；复粒2～8分粒。（图3）

Powder: Pale brownish-yellow. Stone cells singly scattered, pale yellowish, branched or irregular, 43 ~ 147 (200) μm in diameter, with large lumina. Pericyclic fibres mostly bundled, pale yellowish, 18 ~ 34μm in diameter, septate. Wood fibres in bundles, 10 ~ 26μm in diameter, the walls obliquely pitted or cross pitted. Vessels bordered pitted. Crystals of calcium oxalate minute. Starch granules 3 ~ 12μm in diameter; compound granules of 2 ~ 8 components. (Fig 3)



图3 北豆根（*Menispermum dauricum* 根茎）粉末

[Fig3 Powder of rhizome from *Menispermum dauricum*]

1. 石细胞（Stone cells） 2. 中柱鞘纤维（Pericyclic fibres） 3. 木纤维（Xylem fibres） 4. 导管（Vessels） 5. 草酸钙结晶（Crystals of calcium oxalate） 6. 淀粉粒（Starch granules）

北 沙 参

Beishashen

RADIX GLEHNIAE

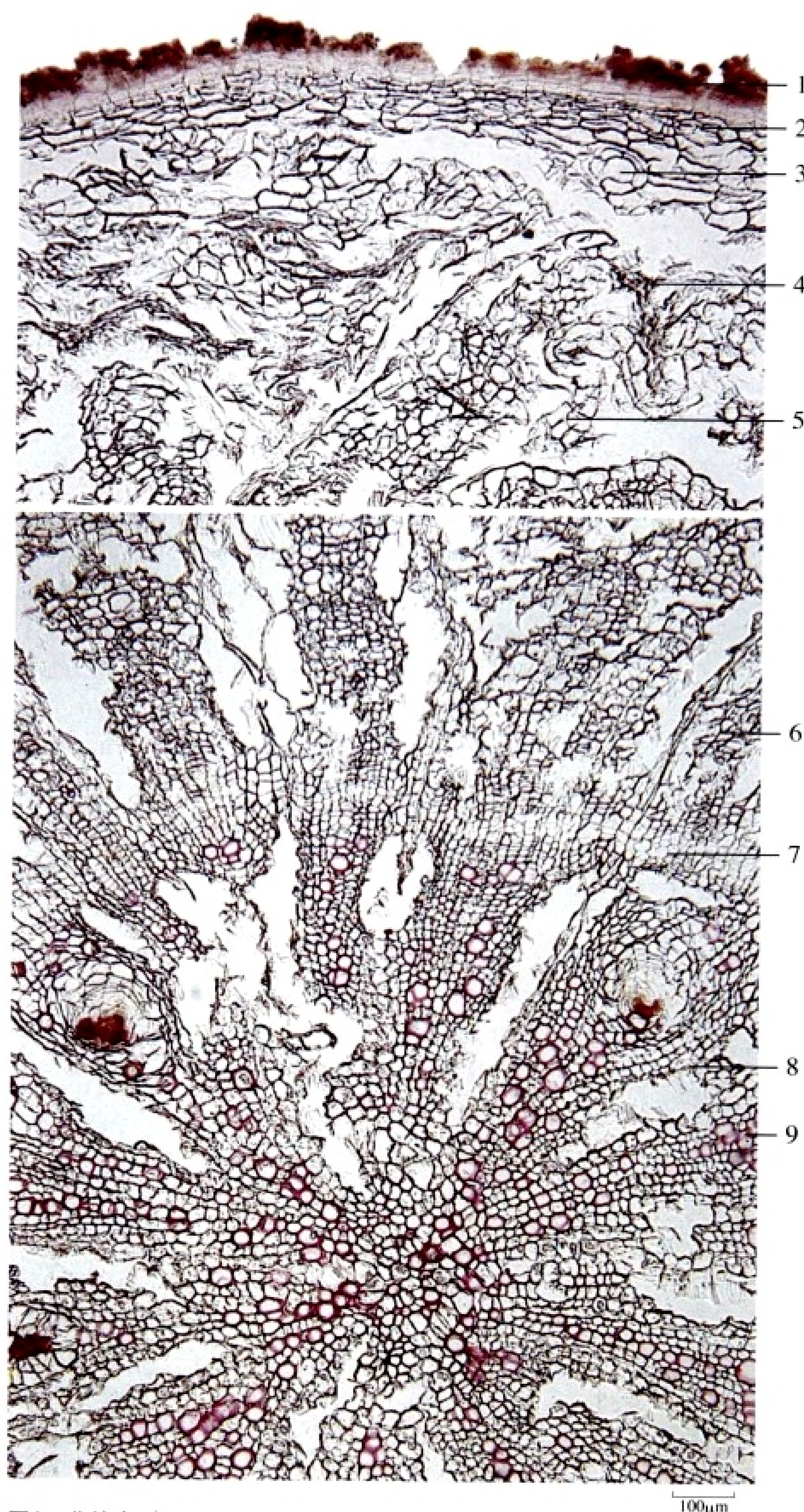


图1 北沙参（*Glehnia littoralis* 根） 横切面

[Fig1 Transverse section of root from *Glehnia littoralis*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 分泌道（Secretory canals） 4. 韧皮部颓废筛管群（Obliterated sieve tube groups of phloem） 5. 韧皮射线（Phloem rays） 6. 韧皮部筛管群（Sieve tube groups of phloem） 7. 形成层（Cambium） 8. 木射线（Xylem rays） 9. 木质部导管（Vessels of xylem）

本品为伞形科植物珊瑚菜*Glehnia littoralis* Fr. Schmidt ex Miq. 的干燥根。

[显微特征]　本品横切面：栓内层为数列薄壁细胞，有分泌道散在。不去外皮的可见木栓层。韧皮部宽广，射线明显；外侧筛管群颓废作条状；分泌道散在，直径20～65μm，内含黄棕色分泌物，周围分泌细胞5～8个。形成层成环。木质部射线宽2～5列细胞；导管大多呈“V”形排列；薄壁细胞含糊化淀粉粒。（图1）

Transverse section: Phelloderm of several layers of parenchymatous cells, scattered with secretory canals. Cork visible when unpeeled. Phloem broad, rays distinct, sieve tube groups collapsed in the outer part and appearing as a narrow band; secretory canals scattered, 20～65μm in diameter, containing yellowish-brown secretion, surrounded by 5～8 secretory cells. Cambium in a ring. Xylem rays 2～5 cells wide; most vessels arranged in V-shape; parenchymatous cells containing gelatinized starch granules. (Fig 1)

仙　茅

Xianmao

RHIZOMA CURCULIGINIS

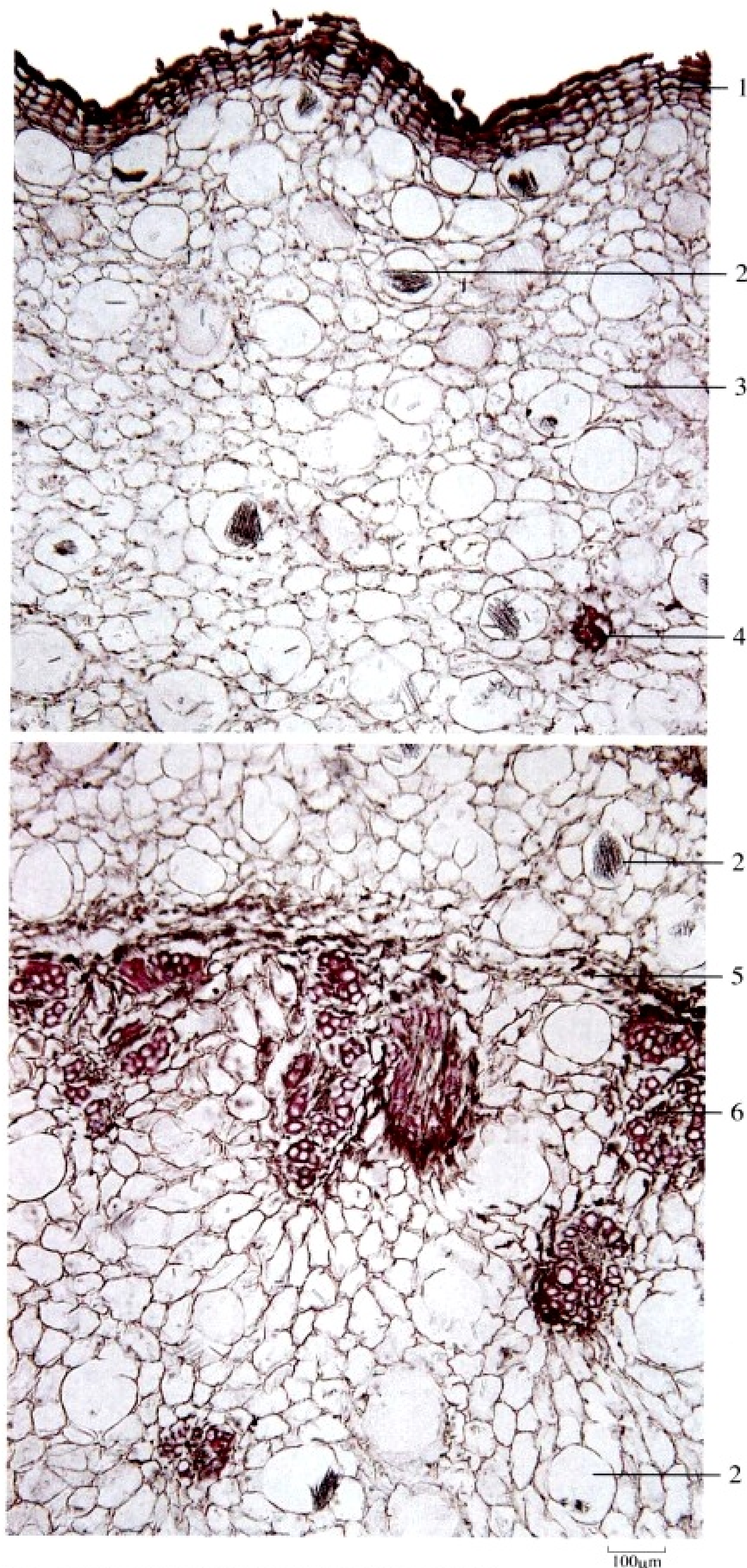


图1　仙茅（*Curculigo orchioides* 根茎）横切面

[Fig1　Transverse section of rhizome from *Curculigo orchioides*]

1. 木栓层（Cork）　2. 黏液细胞及草酸钙针晶（Mucilage cells and raphides of calcium oxalate）　3. 皮层（Cortex）　4. 根迹维管束（Root trace vascular bundles）　5. 内皮层（Endodermis）　6. 中柱维管束（Stele vascular bundles）

本品为石蒜科植物仙茅*Curculigo orchioides* Gaertn. 的干燥根茎。

[显微特征]　本品横切面：木栓细胞3～10列。皮层宽广，偶见根迹维管束，皮层外缘有的细胞含草酸钙方晶。内皮层明显。中柱维管束周木型及外韧型，散列。薄壁组织中散有多数黏液细胞，类圆形，直径60～200μm，内含草酸钙针晶束，长50～180μm。薄壁细胞充满淀粉粒。(图1、2)

Transverse section: Cork consisting of 3 ~ 10 layers of cells. Cortex broad, occasionally showing root trace vascular bundles, some marginal cells containing prisms of calcium oxalate, endodermis distinct. Stele vascular bundles amphivasal and collateral, scattered. Mucilage cells numerous, scattered in parenchyma, subrounded, 60 ~ 200μm in diameter, containing raphides of calcium oxalate, 50 ~ 180μm long. Parenchymatous cells filled with starch granules.（Fig 1, 2）

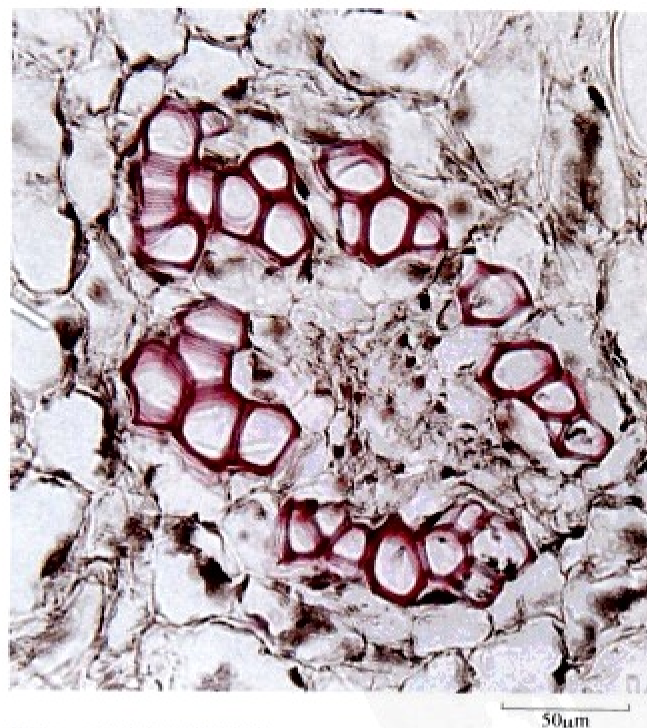


图2　示周木型维管束

[Fig2　Showing amphivasal vascular bundle]

仙 鹤 草

Xianhecao

HERBA AGRIMONIAE

本品为蔷薇科植物龙芽草*Agrimonia pilosa* Ledeb. 的干燥地上部分。

[显微特征] **本品叶的粉末**：暗绿色。上表皮细胞多角形；下表皮细胞壁波状弯曲，气孔不定式或不等式。非腺毛单细胞，长短不一，壁厚，木化，具疣状突起，少数有螺旋纹理。小腺毛头部1～4细胞，卵圆形，柄1～2细胞；另有少数腺鳞，头部单细胞，直径约至68μm，含油滴，柄单细胞。草酸钙簇晶甚多，直径9～50μm。(图1)

Powder: Dark green. Upper epidermal cells polygonal; the walls of lower epidermis sinuous, stomata anomocytic or anisocytic. Non-glandular hairs unicellular, varying in length, walls thickened and lignified, with warty prominences, and sparsely with spiral striations. Small glandular hairs each composed of an ovoid,1 ～ 4 celled head and a 1 ～ 2 celled stalk; a few glandular scales present, each composed of an unicellular head and an unicellular stalk, head up to 68μm in diameter, containing volatile oil drops. Clusters of calcium oxalate fairly abundant, 9～50μm in diameter. (Fig 1)



图1 仙鹤草（*Agrimonia pilosa* 叶）粉末

[Fig1 Powder of leaf from *Agrimonia pilosa*]

1. 上表皮细胞（Upper epidermal cells） 2. 下表皮细胞（Lower epidermal cells） 3. 非腺毛（Non-glandular hairs）
4. 小腺毛（Small glandular hairs） 5. 腺鳞（Glandular scales） 6. 草酸钙簇晶（Clusters of calcium oxalate）

白　　及

Baiji

RHIZOMA BLETILLAE

本品为兰科植物白及*Bletilla striata* （Thunb.） Reichb. f. 的干燥块茎。

[显微特征]　**本品粉末**：淡黄白色。表皮细胞表面观垂周壁波状弯曲，略增厚，木化，孔沟明显。草酸钙针晶束存在于大的类圆形黏液细胞中，或随处散在，针晶长18～88μm。纤维成束，直径11～30μm，壁木化，具人字形或椭圆形纹孔；含硅质块细胞小，位于纤维周围，排成纵行。梯纹导管、具缘纹孔导管及螺纹导管直径10～32μm。糊化淀粉粒团块无色。（图1）

Powder: Yellowish-white. The anticlinal walls of epidermal cells sinuous, slightly thickened, lignified, with distinct pit canals. Raphides of calcium oxalate occurring in large subrounded mucilage cells or scattered throughout the powder, needle crystals 18～88μm long. Fibres in bundles, 11～30μm in diameter, walls lignified, with V-shaped or elliptical pits; bundles surrounding by small cells containing silica bodies arranged in rows. Vessels scalariform, bordered pitted and spiral, 10～32μm in diameter. Masses of gelatinized starch granules colourless. （Fig 1）

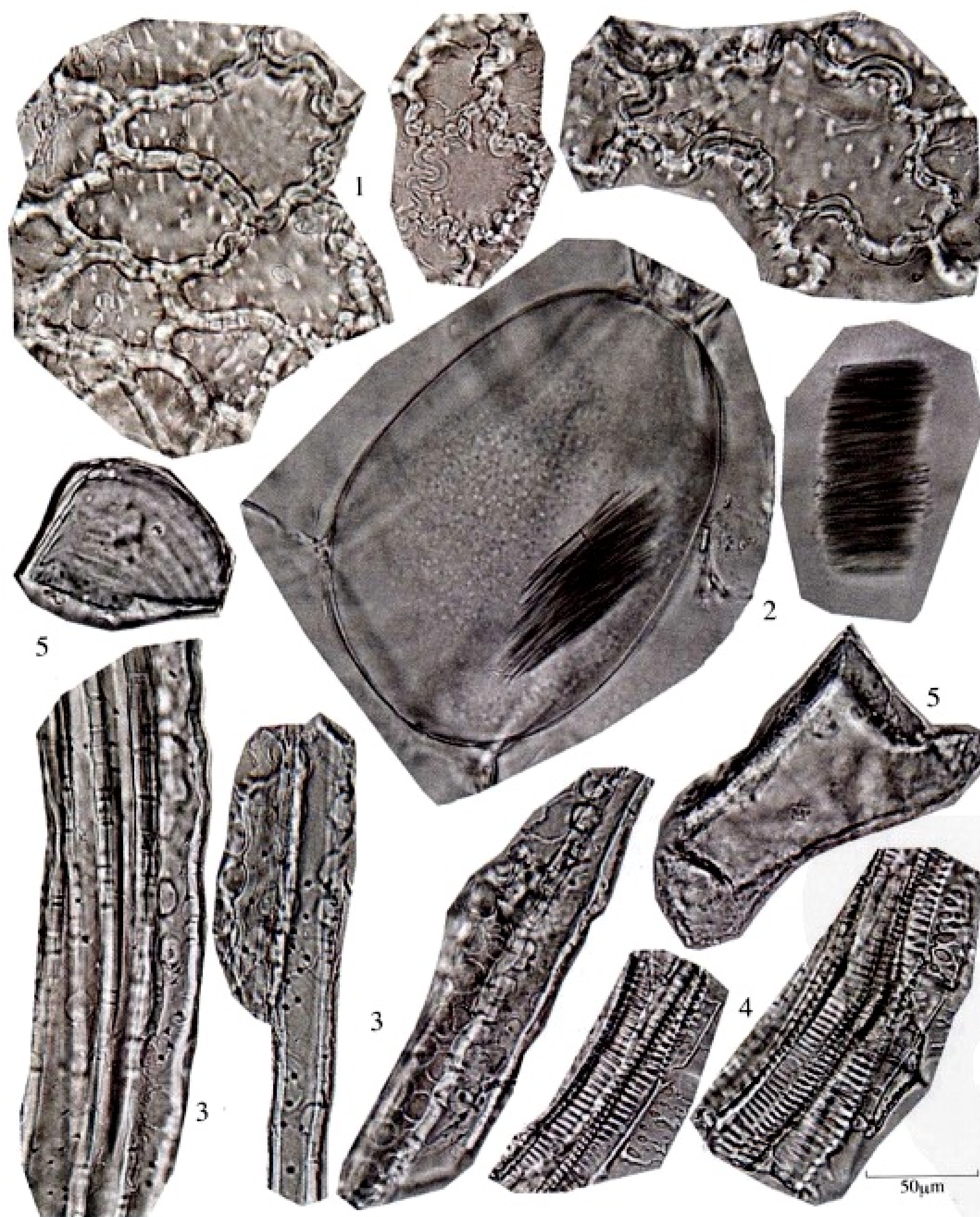


图1　白及 （*Bletilla striata* 块茎） 粉末

[Fig1　Powder of tuber from *Bletilla striata*]

1. 表皮细胞（Epidermal cells）　2. 草酸钙针晶束（Raphides of calcium oxalate）　3. 纤维及含硅质块细胞（Fibres and cells containing silica bodies）　4. 导管 （Vessels）　5. 糊化淀粉粒团块（Masses of gelatinized starch granules）

白　术

Baizhu

RHIZOMA ATRACTYLODIS MACROCEPHALAE

本品为菊科植物白术*Atractylodes macrocephala* Koidz. 的干燥根茎。

[显微特征]　**本品粉末**：淡黄棕色。草酸钙针晶细小，长10～32μm，存在于薄壁细胞中，少数针晶直径至4μm。纤维黄色，大多成束，长梭形，直径约至40μm，壁甚厚，木化，孔沟明显。石细胞淡黄色，类圆形、多角形、长方形或少数纺锤形，直径37～64μm。薄壁细胞含菊糖，表面显放射状纹理。导管分子短小，为网纹及具缘纹孔，直径至48μm。(图1)

Powder: Yellowish-brown. Needle crystals of calcium oxalate minute, 10 ~ 32μm long, aggregated in parenchymatous cells, a few needle crystals up to 4μm in diameter. Fibres yellow, mostly in bundles, long fusiform, up to about 40μm in diameter, walls fairly thickened, lignified, with distinct pit canals. Stone cells yellowish, subrounded, polygonal, rectangular, rarely fusiform, 37 ~ 64μm in diameter. Parenchymatous cells containing inulin with radial striations. Vessel elements short, reticulate and bordered pitted, up to 48μm in diameter. (Fig. 1)

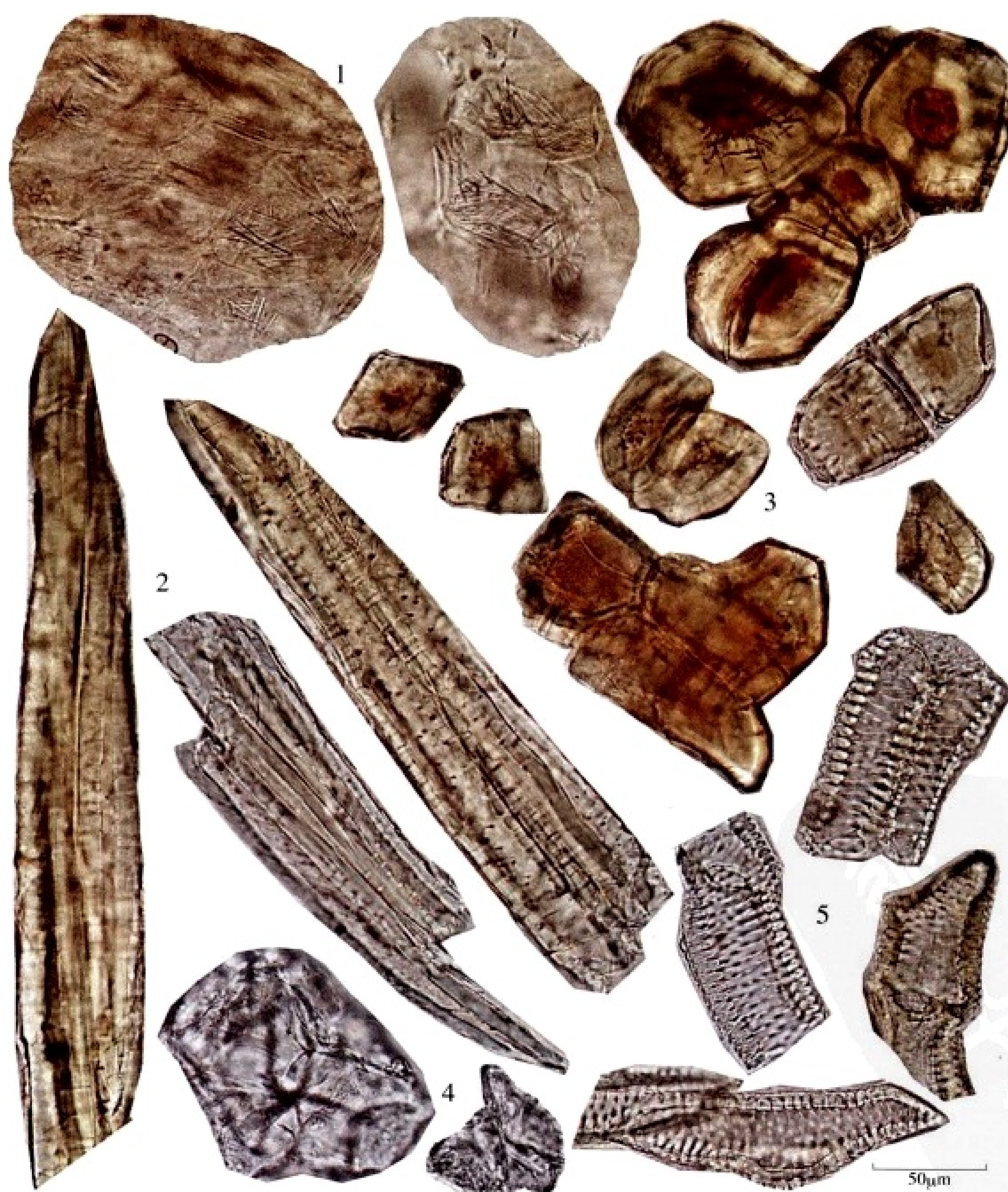


图1　白术（*Atractylodes macrocephala* 根茎）粉末

[Fig1　Powder of rhizome from *Atractylodes macrocephala*]

1. 草酸钙针晶（Needles of calcium oxalate）　2. 纤维（Fibres）　3. 石细胞（Stone cells）　4. 菊糖（Inulin）　5. 导管（Vessels）

白　头　翁
Baitouweng
RADIX PULSATILLAE

本品为毛茛科植物白头翁*Pulsatilla chinensis*（Bge.）Regel的干燥根。

[显微特征]　本品粉末：灰棕色。韧皮纤维梭形或纺锤形，长100～390μm，直径16～42μm，壁木化。非腺毛单细胞，直径13～33μm，基部稍膨大，壁大多木化，有的可见螺状或双螺状纹理。具缘纹孔导管、网纹导管及螺纹导管，直径10～72μm。(图1)

Powder: Greyish brown. Phloem fibres fusiform or spindle-shaped, 100～390μm long, 16～42μm in diameter, with lignified walls. Non-glandular hairs unicellular, 13～33μm in diameter, the base slightly inflated, the walls mostly lignified, some showing spiral or double spiral striations. Bordered pitted, reticulated or spiral vessels 10～72μm in diameter.（Fig 1）



图1　白头翁（*Pulsatilla chinensis* 根）粉末

[Fig1　Powder of root from *Pulsatilla chinensis*]

1. 韧皮纤维（Phloem fibres）　2. 非腺毛（Non-glandular hairs）　3. 导管（Vessels）

白　芍

Baishao

RADIX PAEONIAE ALBA

本品为毛茛科植物芍药*Paeonia lactiflora* Pall. 的干燥根。

[显微特征]　**本品粉末：**黄白色。糊化淀粉粒团块甚多。草酸钙簇晶直径11～35μm，存在于薄壁细胞中，常排列成行，或一个细胞中含数个簇晶。具缘纹孔导管及网纹导管直径20～65μm。纤维长梭形，直径15～40μm，壁厚，微木化，具大的圆形纹孔。（图1）

Powder: Yellowish-white. Masses of gelatinized starch granules fairly abundant. Clusters of calcium oxalate 11 ~ 35μm in diameter, packed in parenchymatous cells, often arranged in a row, or several ones in a cell. Bordered pitted or reticulated vessels 20 ~ 65μm in diameter. Fibres long fusiform, 15 ~ 40μm in diameter, walls thickened, slightly lignified and large round-pitted. (Fig 1)



图1　白芍（*Paeonia lactiflora* 根）粉末

[Fig1　Powder of root from *Paeonia lactiflora*]

1. 含糊化淀粉粒细胞（Cells containing gelatinized starch granules）

2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 导管（Vessels）　4. 纤维管胞（Fibre tracheids）

白 附 子

Baifuzi

RHIZOMA TYPHONII

本品为天南星科植物独角莲*Typhonium giganteum* Engl. 的干燥块茎。

[显微特征] **本品横切面**：木栓细胞有时残存。内皮层不明显。薄壁组织中散有大型黏液腔，外侧较大，常环状排列，向中心渐小而少，黏液细胞随处可见，内含草酸钙针晶束。维管束散列，外韧型及周木型。薄壁细胞含众多淀粉粒。（图1～3）

Trasverse section: Sometimes cork cells adhering. Endodermis indistinct. Parenchyma scattered with large mucilage cavities, relatively large in the outer part, usually ringed, gradually becoming small and rare to the centre, mucilage cells found everywhere, containing raphides of calcium oxalate. Vascular bundles scattered, collateral and amphivasal. Parenchymatous cells containing abundant starch granules. （Fig 1～3）

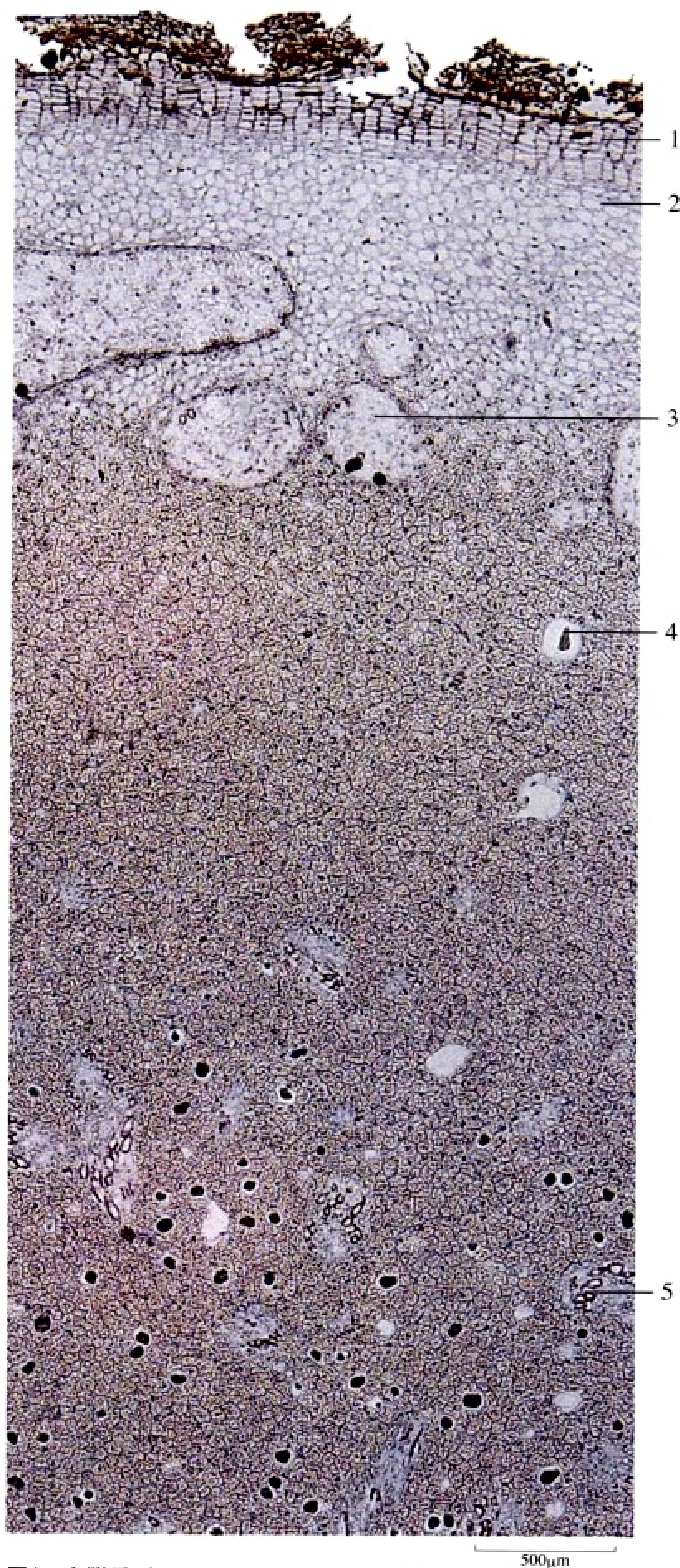


图1 白附子（*Typhonium giganteum* 块茎）横切面

[Fig1 Transverse section of tuber from *Typhonium giganteum*]

1. 木栓层（Cork） 2. 皮层（Cortex） 3. 黏液腔（Mucilage cavities） 4. 黏液细胞（Mucilage cells） 5. 维管束（Vascular bundles）

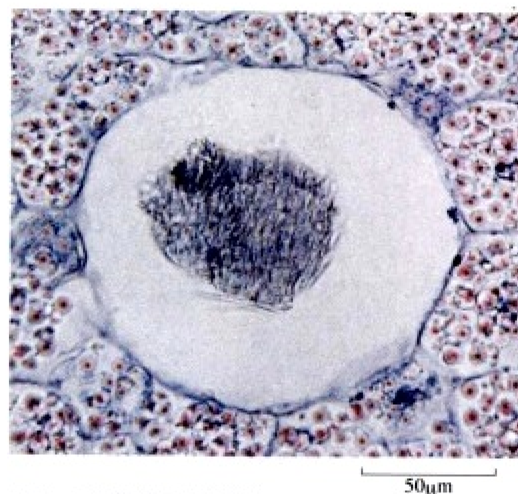


图2 示草酸钙针晶束

[Fig2 Showing raphide of calcium oxalate]

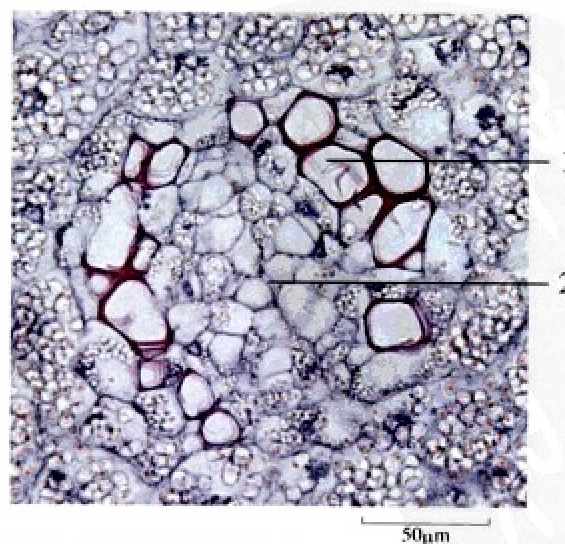


图3 周木型维管束放大

[Fig3 Amphivasal vascular bundle magnified]

1. 木质部（Xylem） 2. 韧皮部（Phloem）

本品粉末：黄白色。淀粉粒甚多，单粒球形或类球形，直径2～29μm，脐点点状、裂缝状或人字状；复粒由2～12分粒组成，以 2～4分粒者为多见。草酸钙针晶束散在或成束存在于黏液细胞中，针晶长约至97（136）μm，螺纹导管、环纹导管直径9～45μm。（图4）

Powder: Yellowish-white. Starch granules abundant, simple granules spherical or subspherical, 2 ~ 29μm in diameter, hilum pointed, slit-shaped or V-shaped; compound granules of 2～12 components, among which 2～4 components visible frequently. Needle crystals of calcium oxalate scattered or in bundles embedded in mucilage cells, needle crystals up to 97 （136）μm long. Spiral and annular vessels 9～45μm in diameter. （Fig4）



图4 白附子（*Typhonium giganteum* 块茎）粉末

[Fig4 Powder of tuber from *Typhonium giganteum*]

1. 淀粉粒（Starch granules） 2. 草酸钙针晶（Needle crystals of calcium oxalate） 3. 导管（Vessels）

白 扁 豆

Baibiandou

SEMEN LABLAB ALBUM

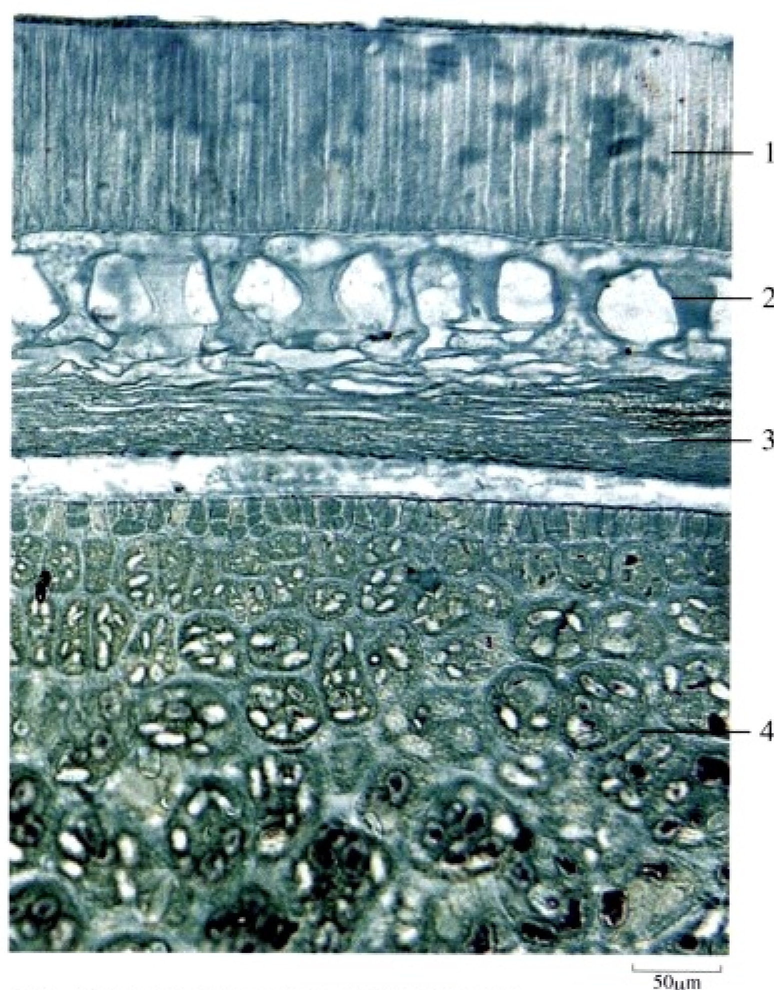


图1 扁豆（*Dolichos lablab* 种子）横切面

[Fig1 Transverse section of seed from *Dolichos lablab*]

1. 表皮栅状细胞（Palisade cells of epidermis） 2. 支柱细胞（Supporting cells）
3. 薄壁细胞（Parenchymatous cells） 4. 子叶细胞（Cotyledon cells）

本品为豆科植物扁豆*Dolichos lablab* L. 的干燥成熟种子。

[显微特征] 本品横切面：表皮为1列栅状细胞，种脐处2列，光辉带明显。支柱细胞1列，呈哑铃状，种脐部位为3～5列。其下为十余列薄壁细胞，内侧细胞呈颓废状。子叶细胞含众多淀粉粒。种脐部位栅状细胞的外侧有种阜，内侧有管胞岛，椭圆形，细胞壁网状增厚，其两侧为星状组织，细胞星芒状，有大型的细胞间隙，有的胞腔含棕色物。（图1～3）

Transverse section: Epidermis consisting of 1 layer of palisade cells, 2 layers at hilum, a light band distinct. Supporting cells of 1 layer, dumbbell-shaped, 3～5 layers at hilum. Parenchyma of 10 layers of cells, located under supporting cells, the inner ones obliterate. Cells of cotyledons containing numerous starch granules. The outer part of palisade cells at hilum with caruncle, the inner part with tracheid islet, elliptical walls reticularly thickened, with stellate tissue at two sides, cells stellate, with large intercellular space, some lumina containing brown contents. (Fig 1～3)

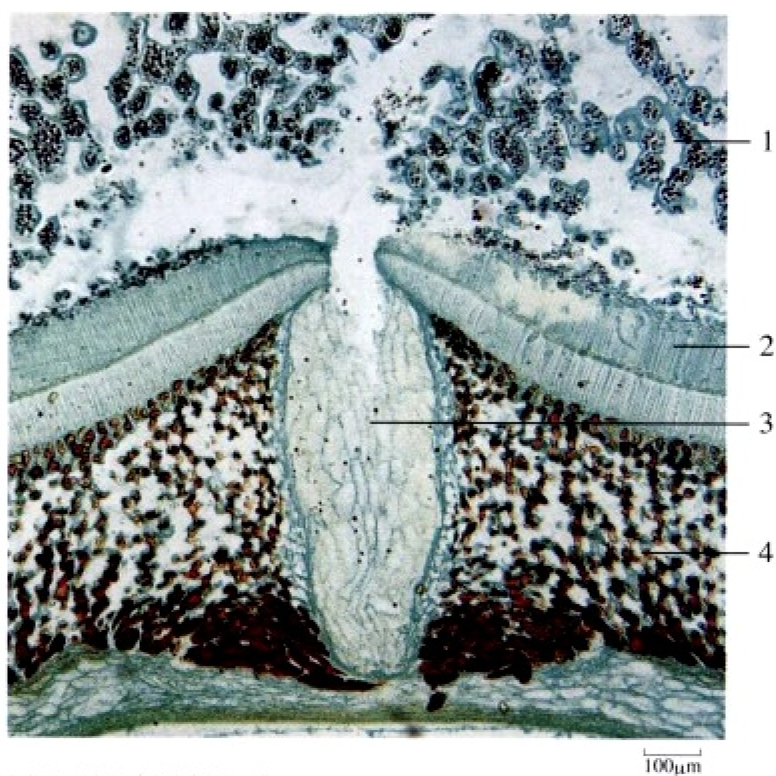


图2 种脐部位横切面

[Fig2 Transverse section of seed at the part of hilum]

1. 种阜（Caruncle） 2. 表皮栅状细胞（Palisade cells of epidermis）
3. 管胞岛（Tracheid islet） 4. 星状组织（Stellate tissue）

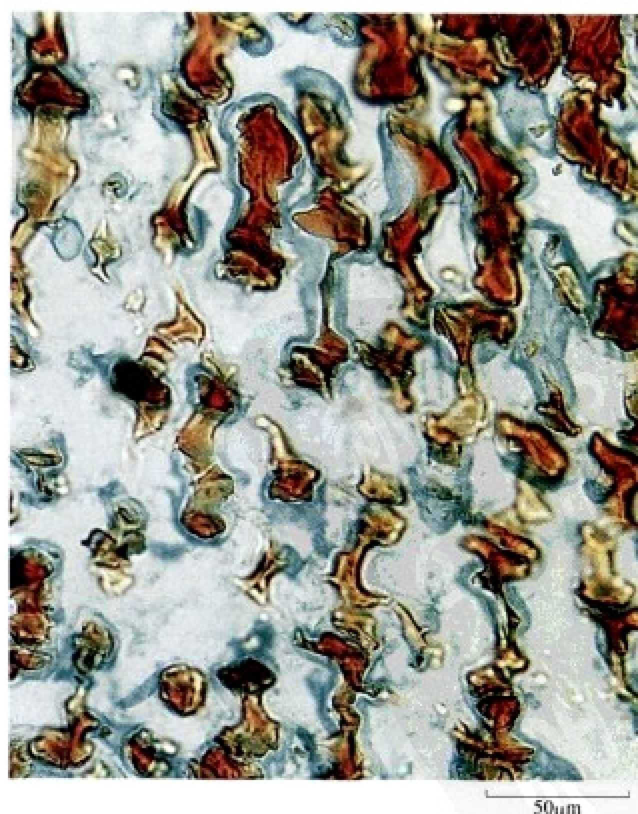


图3 示星状组织

[Fig3 Showing stellate tissue]

白　蔹

Bailian

RADIX AMPELOPSIS

本品为葡萄科植物白蔹*Ampelopsis japonica*（Thunb.）Makino的干燥块根。

[显微特征]　**本品粉末**：淡红棕色。淀粉粒单粒，长圆形、长卵形、肾形或不规则形，直径3～13μm，脐点不明显；复粒少数。草酸钙针晶长86～169μm，散在或成束存在于黏液细胞中。草酸钙簇晶直径25～78μm，棱角宽大。具缘纹孔导管，直径35～60μm。(图1)

Powder: Pale reddish-brown. Starch granules single, oblong, long ovoid, reniform or irregular, 3 ～ 13μm in diameter, hilum indistinct; compound granules less. Needles of calcium oxalate 86～169μm long, scattered or grouped into bundles in mucilage cells. Clusters of calcium oxalate 25 ～ 78μm in diameter, with broad and large angles. Bordered pitted vessels 35 ～ 60μm in diameter.（Fig 1）



图1　白蔹（*Ampelopsis japonica* 块根）粉末

[Fig1　Powder of root from *Ampelopsis japonica*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶（Needles of calcium oxalate）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 导管（Vessels）

白 鲜 皮

Baixianpi

CORTEX DICTAMNI

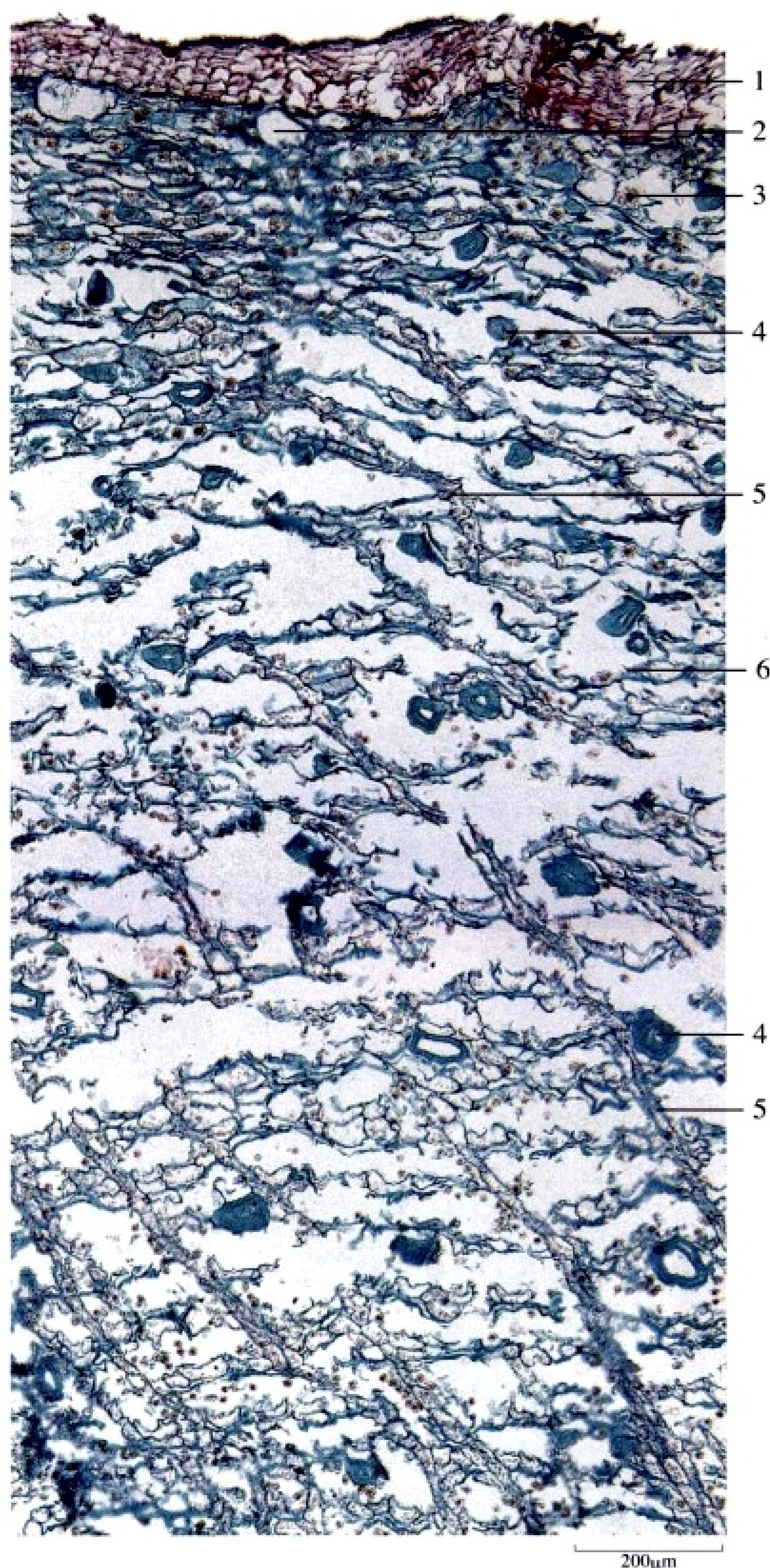


图1 白鲜皮（*Dictamnus dasycarpus* 根皮）横切面

[Fig1 Transverse section of root bark from *Dictamnus dasycarpus*]

1. 木栓层（Cork） 2. 分泌细胞（Secretory cells） 3. 草酸钙簇晶（Clusters of calcium oxalate） 4. 纤维（Fibres） 5. 韧皮射线（Phloem rays） 6. 韧皮部（Phloem）

本品为芸香科植物白鲜*Dictamnus dasycarpus* Turcz. 的干燥根皮。

[显微特征]　本品横切面：木栓层为10余列细胞。栓内层狭窄；纤维多单个散在，黄色，直径25～100μm，壁厚，层纹明显。韧皮部宽广，射线宽1～3列细胞；纤维单个散在。薄壁组织中有多数草酸钙簇晶，直径5～30μm。（图1、2）

Transverse section: Cork cells 10 or more layers. Phelloderm narrow, fibres mostly scattered singly, yellow, 25 ~ 100μm in diameter, walls thickened and obviously striated. Phloem broad, rays 1 ~ 3 cells wide; fibres singly scattered. Parenchyma containing abundant clusters of calcium oxalate, 5 ~ 30μm in diameter. (Fig 1, 2)

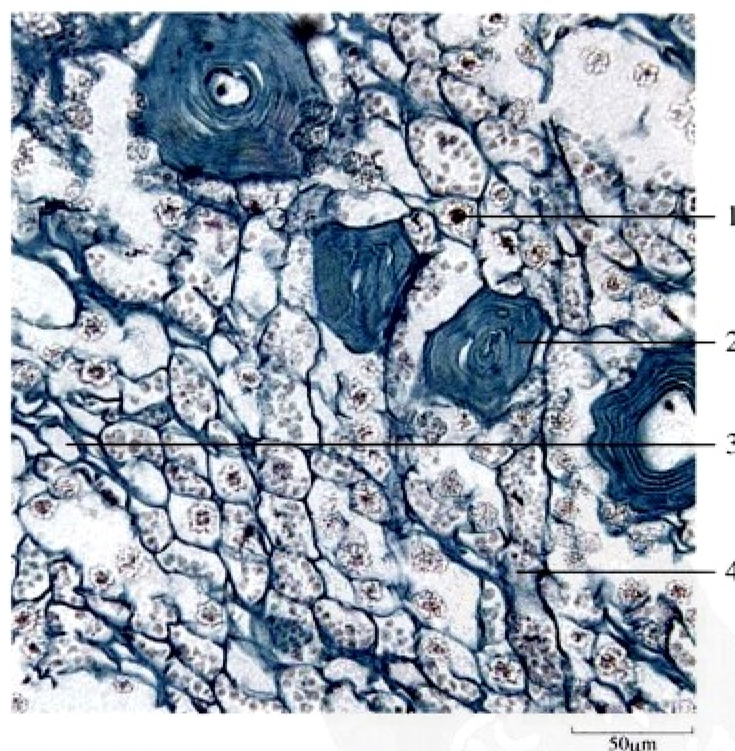


图2 示韧皮部

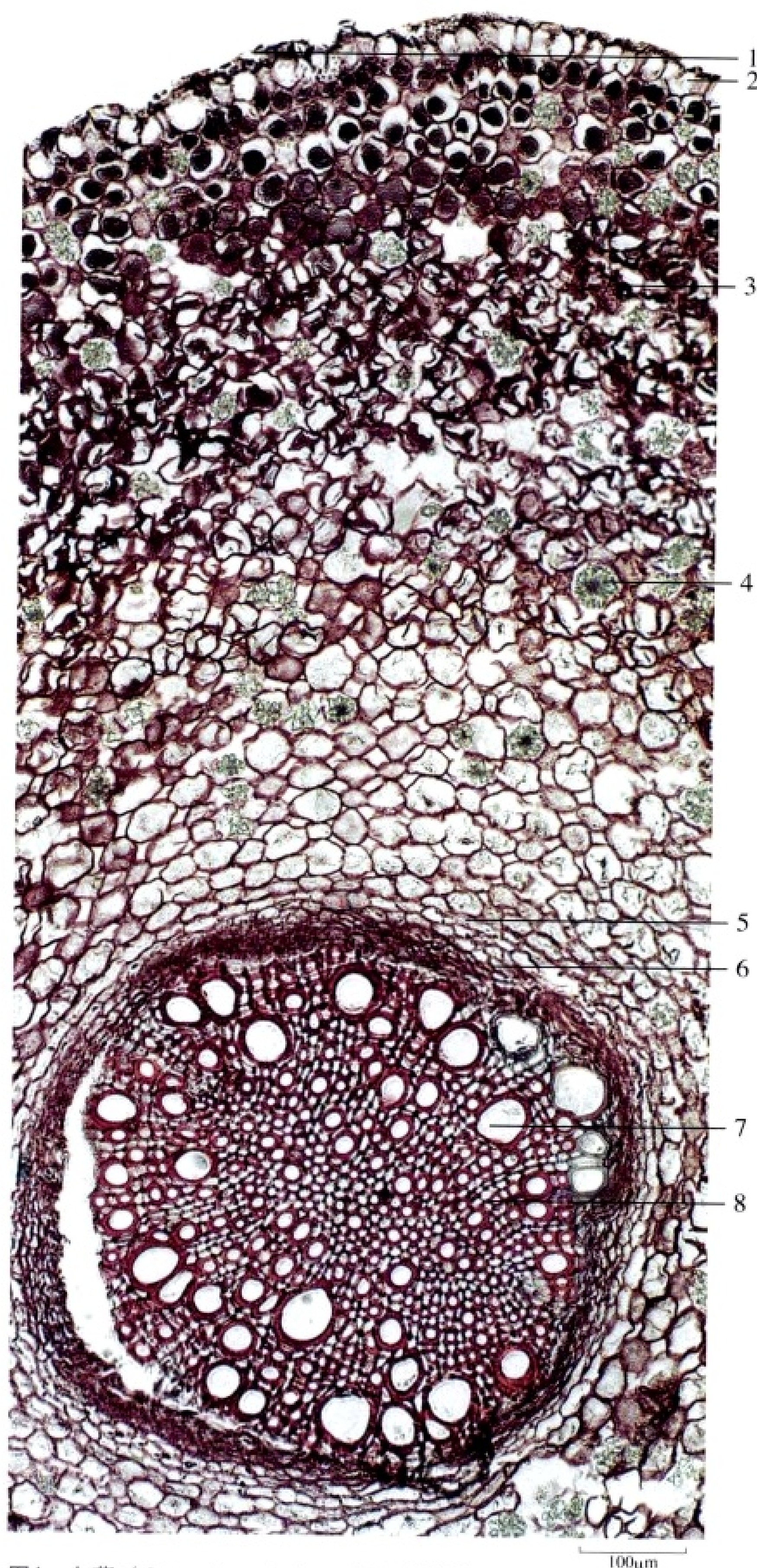
[Fig2 Showing phloem]

1. 草酸钙簇晶（Clusters of calcium oxalate） 2. 纤维（Fibres） 3. 筛管群（Sieve tube groups） 4. 韧皮射线（Phloem rays）

白 薇

Baiwei

RADIX ET RHIZOMA CYNANCHI ATRATI



本品为萝藦科植物白薇*Cynanchum atratum* Bge. 或蔓生白薇*Cynanchum versicolor* Bge. 的干燥根及根茎。

[显微特征]　本品根横切面：表皮细胞1列，通常仅部分残留。下皮细胞1列，径向稍延长；分泌细胞长方形或略弯曲，内含黄色分泌物。皮层宽广，内皮层明显。木质部细胞均木化，导管大多位于两侧，木纤维位于中央。薄壁细胞含草酸钙簇晶及大量淀粉粒。（图1、2）

Transverse section: Root of *Cynanchum atratum* Epidermal cells 1 layer, only some remains existed. Hypodermal cells 1 layer, slightly radial elongated; secretory cells rectangular or slightly bended, containing yellowish secretion. Cortex broad, endodermis distinct. Xylem cells all lignified, vessels mostly at laterals and fibres at centre. Parenchymatous cells containing clusters of calcium oxalate and numerous of starch granules.　(Fig 1, 2)

图1　白薇（*Cynanchum atratum* 根）横切面
[Fig1　Transverse section of root from *Cynanchum atratum*]
1. 表皮细胞（Epidermal cells）　2. 下皮细胞（Hypodermal cells）　3. 皮层（Cortex）　4. 草酸钙簇晶(Clusters of calcium oxalate)　5. 内皮层(Endodermis)　6. 韧皮部（Phloem）　7. 木质部（Xylem）　8. 木纤维（Xylem fibres）

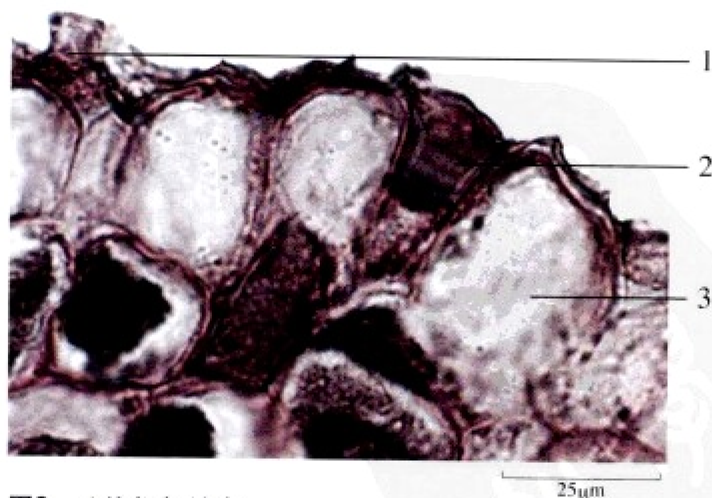


图2　分泌组织放大
[Fig2　Secretory cell magnified]
1. 表皮细胞（Epidermal cells）　2. 分泌细胞（Secretory cell）　3. 下皮细胞（Hypodermal cells）

本品粉末：灰棕色。草酸钙簇晶较多，直径7～45μm。分泌细胞类长方形，常内含黄色分泌物。木纤维长160～480μm，直径14～24μm。石细胞长40～50μm，直径10～30μm。导管以网纹导管、具缘纹孔导管为主。淀粉粒单粒脐点点状、裂缝状或三叉状，直径4～10μm；复粒由2～6分粒组成。（图3）

Powder of *Cynanchum atratum:* Greyish-brown. Clusters of calcium oxalate relatively numerous, 7～45μm in diameter. Secretory cells subrectangular, often containing yellowish secretion. Xylem fibres 160～480μm long, 14～24μm in diameter. Stone cells 40～50μm long,10～30μm in diameter. Vessels mostly reticulated or bordered pitted thickened. Single starch granules 4～10μm in diameter, hilum pointed, slit-shaped or three forked; compound granules of 2～6 components. (Fig 3)

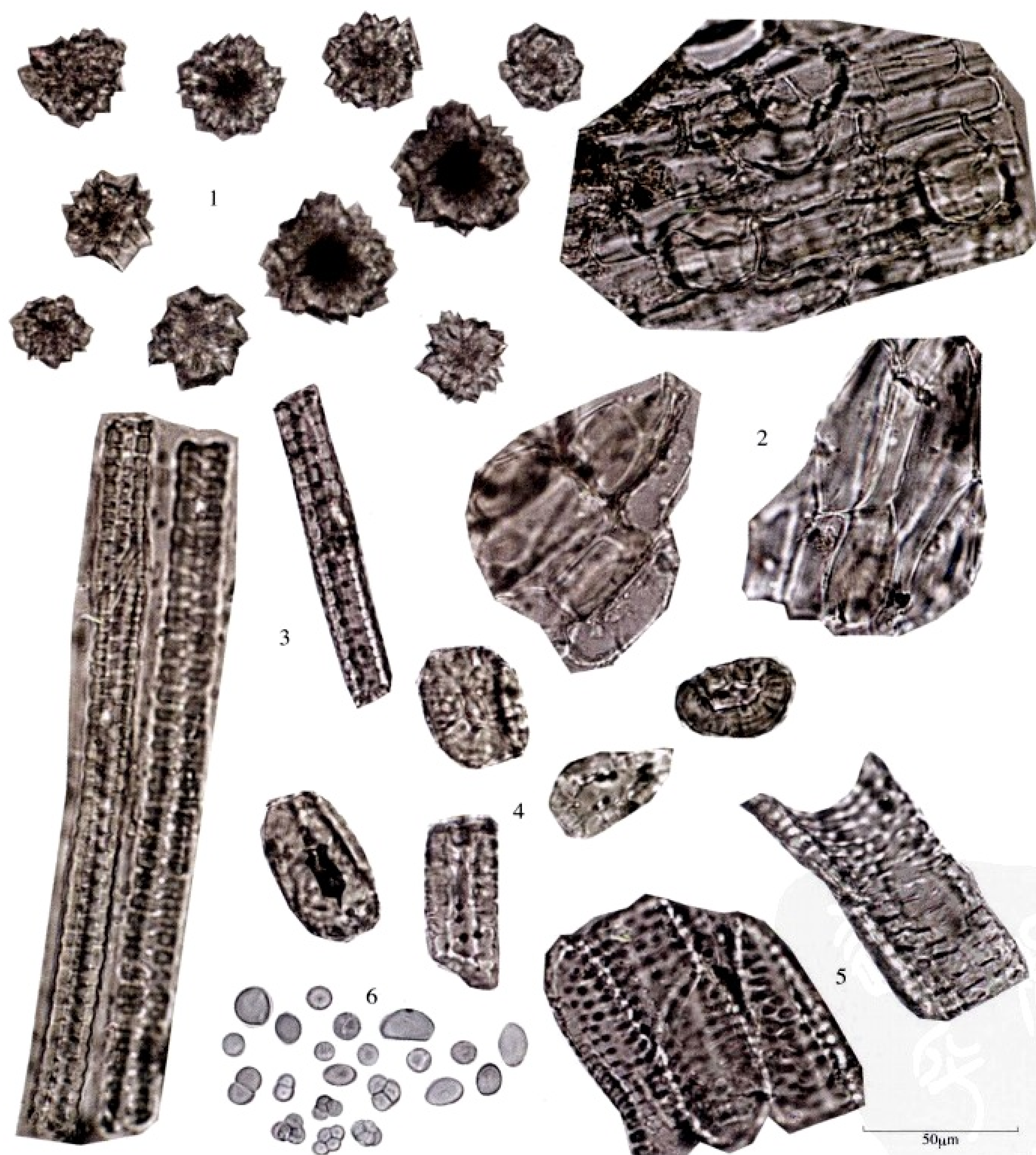


图3 白薇（*Cynanchum atratum* 根）粉末

[Fig3 Powder of root from *Cynanchum atratum*]

1. 草酸钙簇晶（Clusters of calcium oxalate） 2. 分泌细胞（Secretory cells） 3. 木纤维（Xylem fibres）
4. 石细胞（Stone cells） 5. 导管（Vessels） 6. 淀粉粒（Starch granules）

冬瓜皮
Dongguapi
EXOCARPIUM BENINCASAE

本品为葫芦科植物冬瓜*Benincasa hispida* （Thunb.） Cogn. 的干燥外层果皮。

[显微特征]　本品粉末：淡棕黄色至黄绿色。果皮表皮细胞表面观类多角形，垂周壁平直；气孔不定式，副卫细胞5～7个。石细胞大多成群，呈类圆形或多角形，直径10～56μm，纹孔及孔沟明显。螺纹导管多见，直径16～54μm。(图1)

Powder: Brownish-yellow to yellowish-green. Epidermal cells of the pericarp subpolygonal in surface view, anticlinal walls smooth and straight; stomata anomocytic, subsidiary cells 5～7. Stone cells aggregated, subrounded or polygonal, 10～56μm in diameter, pits and pit canals distinct. Spiral vessels numerous, 16～54μm in diameter. （Fig 1）

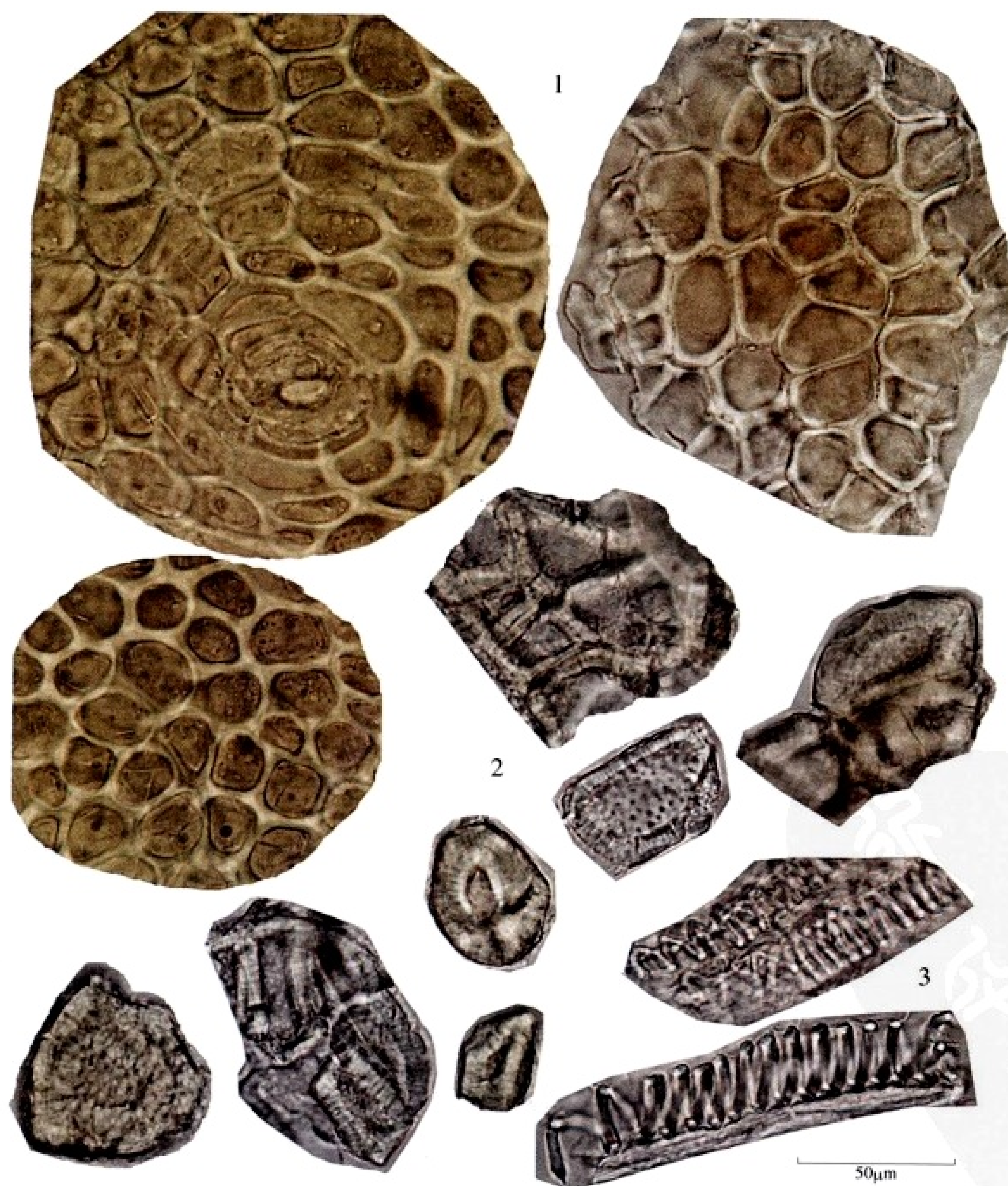


图1　冬瓜皮 （*Benincasa hispida* 外层果皮 ）粉末

[Fig1　Powder of outer layers of pericarp from *Benincasa hispida*]

1. 果皮表皮细胞(Epidermal cells of the pericarp)　2. 石细胞(Stone cells)　3. 导管(Vessels)

冬 葵 果

Dongkuiguo

FRUCTUS MALVAE

本品系蒙古族习用药材。为锦葵科植物冬葵*Malva verticillata* L. 的干燥成熟果实。

[显微特征] **本品宿萼表面观**：下表皮星状毛由2～8个（多由4～8个）细胞组成，单个细胞长50～1140μm，直径约75μm，壁稍厚；腺毛头部椭圆形，5～7个细胞，直径25～38μm。上表皮单细胞非腺毛细长，弯曲或平直，长约至1190μm，壁薄或稍厚。上下表皮气孔均为不等式。叶肉薄壁细胞含草酸钙簇晶，直径6～25μm，棱角较尖。（图1）

Surface view of persistent calyx: Stellate hairs of lower epidermis 2～8 celled (mostly 4～8 celled) with individual cell 50～1140μm long and about 75μm in diameter, slightly thick-walled; sessile glandular hairs elliptical, 5～7 celled, each 25～38μm in diameter. Unicellular non-glandular hairs of upper epidermis slender, curved or straight, up to 1190μm long, with thin or slightly thickened walls. Anomocytic stomata on both surface. Parenchymatous cells in mesophyll containing clusters of calcium oxalate, 6～25μm in diameter, with more acute angles. (Fig 1)

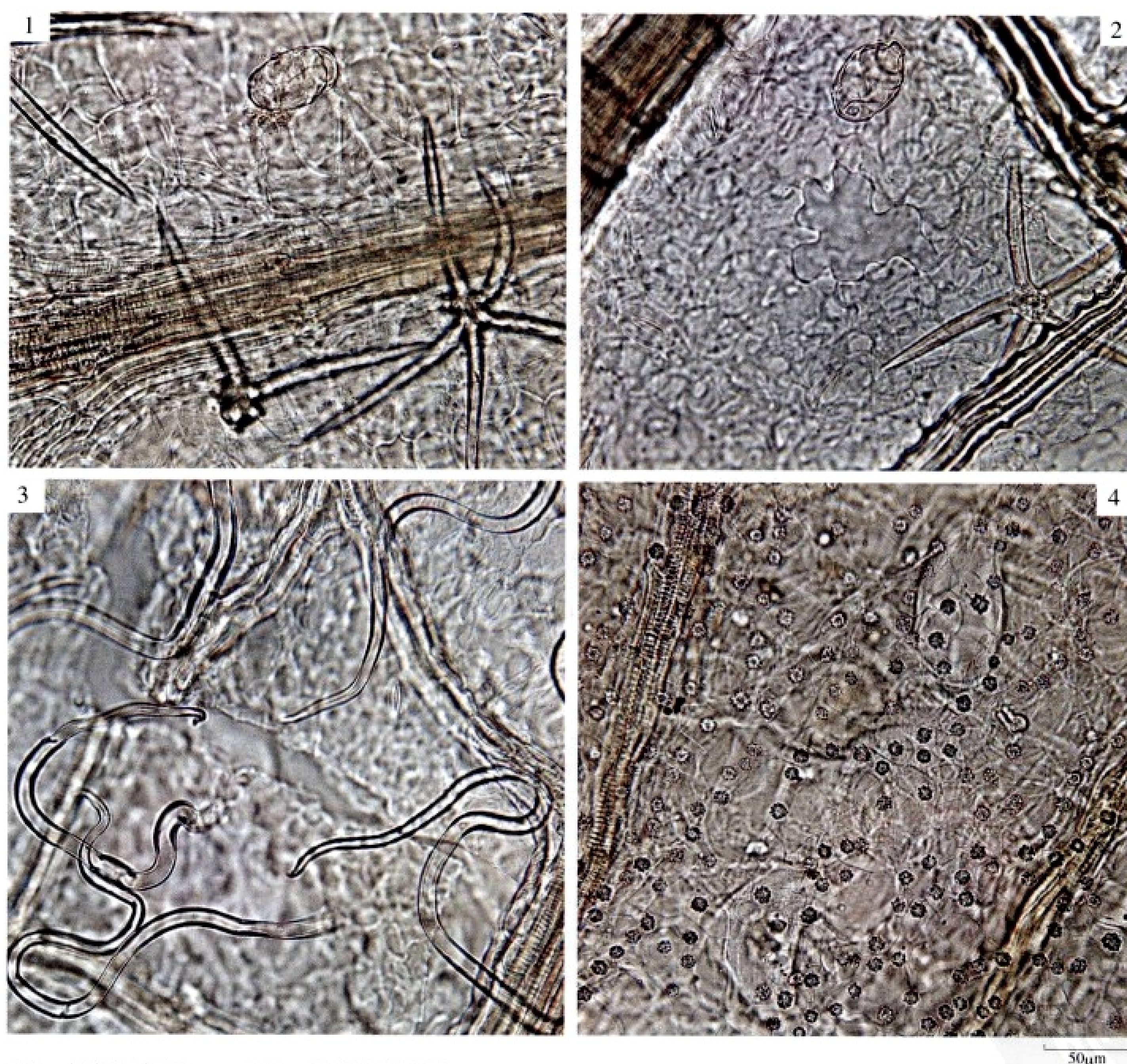


图1 冬葵果（*Malva verticillata* 宿萼）表面观

[Fig1 Surface view of persistent calyx of fruit from *Malva verticillata*]

1. 下表皮星状毛和腺毛（Stellate and glandular hairs of lower epidermis） 2. 气孔（Stomata） 3. 上表皮非腺毛（Non-glandular hairs of upper epidermis） 4. 草酸钙簇晶（Clusters of calcium oxalate）

本品果皮横切面：外果皮为一层长方形表皮细胞，壁稍厚，外被角质层。中果皮由2～3层类圆形薄壁细胞和一层含草酸钙棱晶的细胞组成，薄壁组织中有大型黏液细胞散在。含晶细胞类圆形，壁厚且木化。中果皮与内果皮间有10余束纤维束，呈环状排列。内果皮为一列径向延长的石细胞，呈栅栏状，侧壁及内壁甚厚，木化。（图2、3）

Transverse section of pericarp: Epicarp consisting of a single layer of rectangular epidermal cells with slightly thickened walls, covered by cuticula outside. Mesocarp consisting of 2 ~ 3 layers of subrounded parenchymatous cells and a single layer cells containing prism crystals with thickened and lignified walls, scattered with large mucilage cells. More than 10 fibre bundles arranged in a ring between mesocarp and endocarp. Endocarp consisting of a single layer of radially elongated stone cells, palisade-like, with strongly thickened and lignified lateral and inner walls. （Fig 2, 3）



图2 冬葵果（*Malva verticillata* 果皮）横切面

[Fig2 Transverse section of fruit from *Malva verticillata*]

1. 外果皮细胞（Epicarp cells） 2. 黏液细胞（Mucilage cells） 3. 纤维束（Fibres） 4. 中果皮薄壁细胞（Mesocarp cells） 5. 含晶细胞（Crystal-contained cells） 6. 内果皮细胞（Endocarp cells）

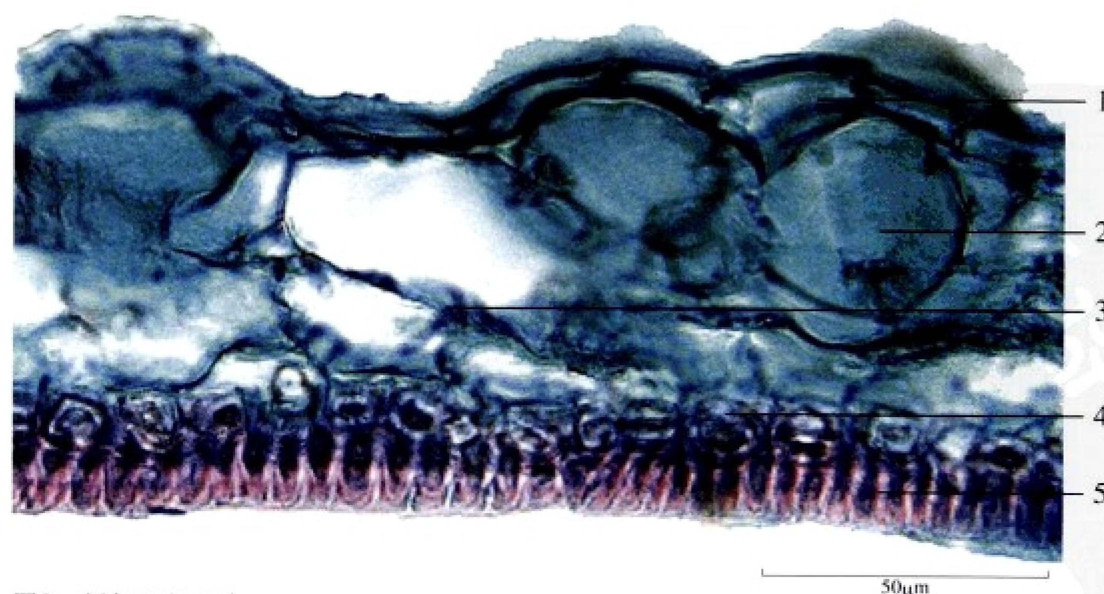


图3 局部组织放大

[Fig3 Partial tissue magnified]

1. 外果皮细胞（Epicarp cells） 2. 黏液细胞（Mucilage cells） 3. 中果皮薄壁细胞（Mesocarp cells） 4. 含晶细胞（Crystal-contained cells） 5. 内果皮细胞（Endocarp cells）

玄　　参

Xuanshen

RADIX SCROPHULARIAE

本品为玄参科植物玄参*Scrophularia ningpoensis* Hemsl. 的干燥根。

[显微特征]　本品横切面：皮层较宽，石细胞单个散在或2～5个成群，多角形、类圆形或类方形，壁较厚，层纹明显。韧皮射线多裂隙。形成层成环。木质部射线宽广，亦多裂隙；导管少数，类多角形，直径约至113μm，伴有木纤维。薄壁细胞含核状物。（图1～3）

Transverse section: Cortex relatively broad, stone cells scattered singly or 2～5 in groups, polygonal, subrounded or subsquare, with thicker walls and distinct striations. Phloem rays much cleft. Cambium in a ring. Xylem rays broad, also much cleft; vessels less, subpolygonal, up to 113μm in diameter, accompanied with wood fibres. Parenchymatous cells containing nucleus-like substances. (Fig 1～3)

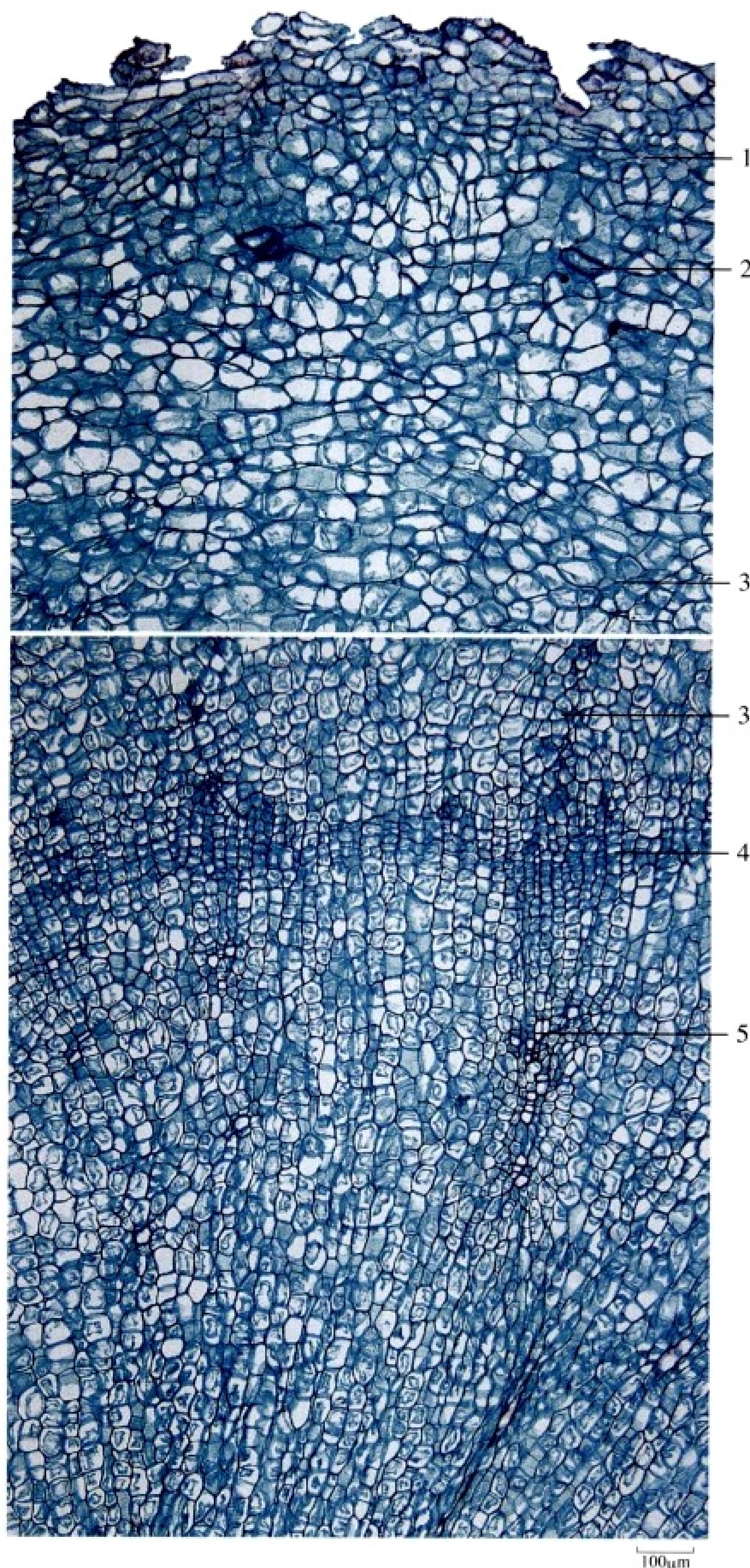


图1　玄参（*Scrophularia ningpoensis* 根）横切面

[Fig1　Transverse section of root from *Scrophularia ningpoensis*]

1. 皮层（Cortex）　2. 石细胞（Stone cells）　3. 韧皮部（Phloem）　4. 形成层（Cambium）　5. 木质部（Xylem）

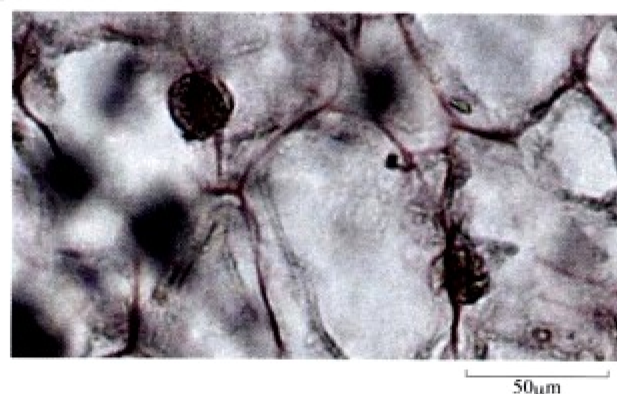


图2　示薄壁细胞含核状物

[Fig2　Showing parenchymatous cells containing nucleus-like substances]

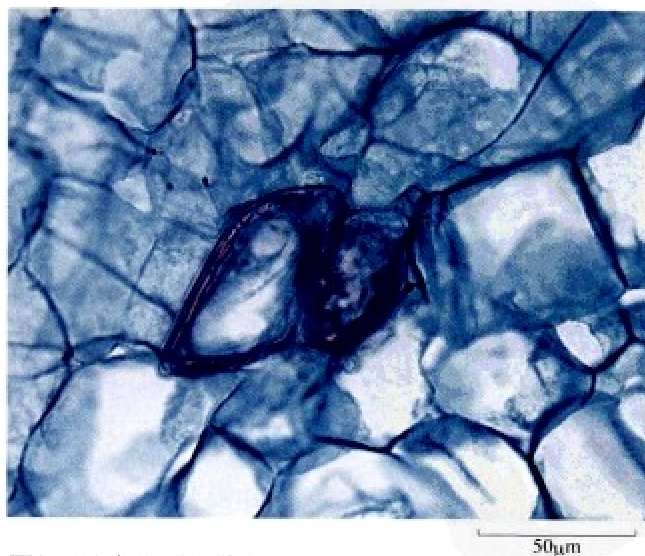


图3　示皮层石细胞

[Fig3　Showing stone cells in cortex]

半 边 莲

Banbianlian

HERBA LOBELIAE CHINENSIS

本品为桔梗科植物半边莲*Lobelia chinensis* Lour. 的干燥全草。

[显微特征] 本品粉末：灰绿黄色或淡棕黄色。叶表皮细胞垂周壁微波状，气孔不定式，副卫细胞3～7个。螺纹导管和网纹导管多见，直径7～34μm。草酸钙簇晶常存在于导管旁，有时排列成行。导管旁可见乳汁管，内含颗粒状物和油滴状物。薄壁细胞中含菊糖。(图1)

Powder: Greyish greenish-yellow or pale brownish-yellow. The anticlinal walls of leaf epidermal cells slightly sinuous, stomata anomocytic, subsidiary cells 3 ～ 7. Spiral vessels and reticulate vessels frequently visible, 7 ～ 34μm in diameter. Clusters of calcium oxalate frequently occurring beside vessels, sometimes arranged in rows. Laticiferous tubes visible, containing granular and oily contents. Parenchymatous cells containing inulin. (Fig 1)

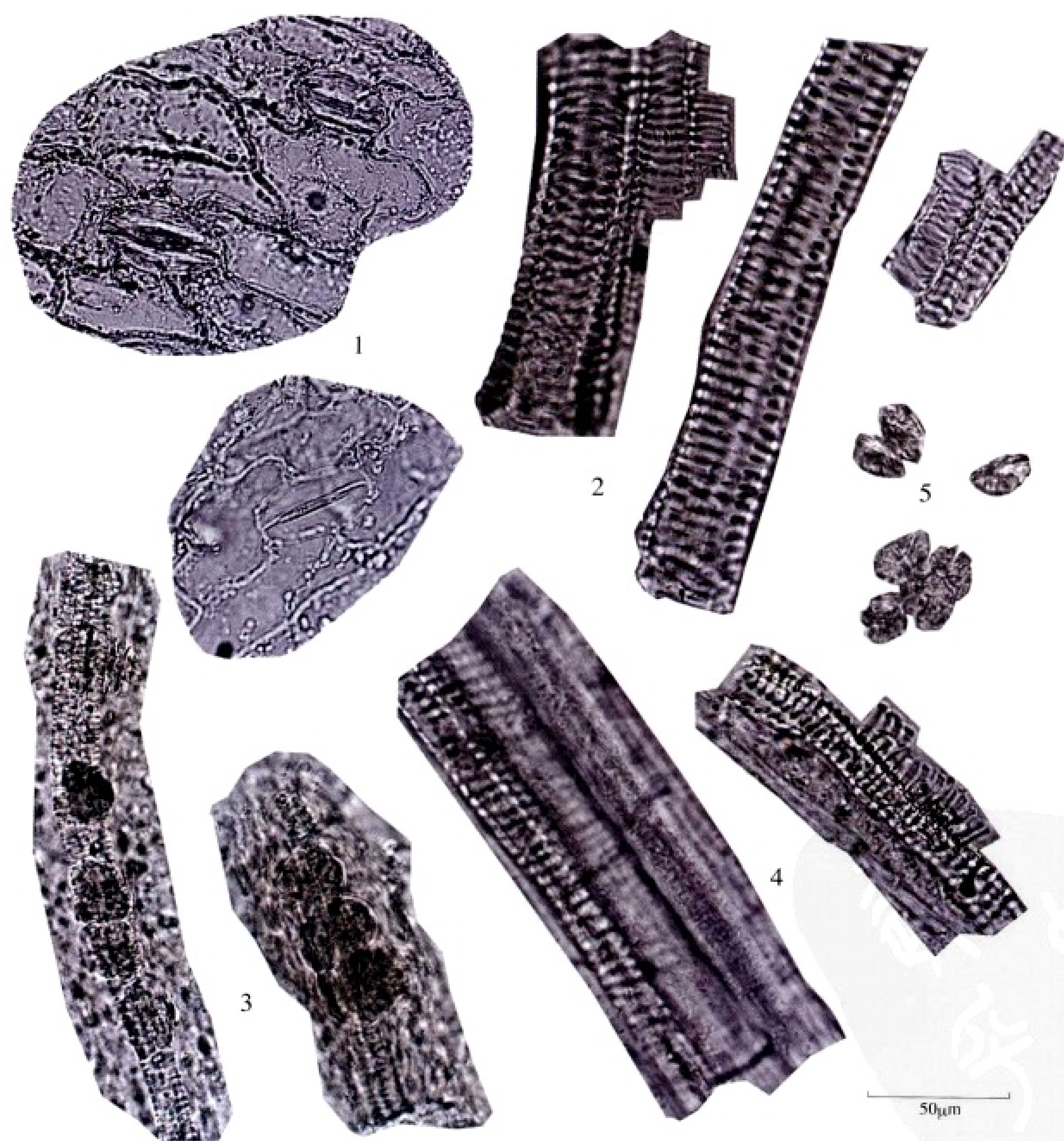


图1　半边莲（*Lobelia chinensis* 全草）粉末

[Fig1　Powder of herb of *Lobelia chinensis*]

1. 叶表皮细胞，示气孔（Epidermal cells of leaf, showing stomata）　2. 导管（Vessels）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 乳汁管（Laticiferous tubes）　5. 菊糖（Inulin）

半　夏

Banxia

RHIZOMA PINELLIAE

本品为天南星科植物半夏*Pinellia ternata*（Thunb.）Breit. 的干燥块茎。

[显微特征] 本品粉末：类白色。淀粉粒甚多，单粒类圆形、半圆形或圆多角形，直径2～20μm，脐点裂缝状、人字状或星状；复粒由2～6分粒组成。草酸钙针晶束存在于椭圆形黏液细胞中，或随处散在，针晶长20～144μm。螺纹导管直径10～24μm。（图1）

Powder: Whitish. Starch granules fairly abundant, simple granules subrounded, semi-circular or rounded polygonal, 2 ~ 20μm in diameter, hilum slit-shaped, V-shaped or stellate; compound granules of 2 ~ 6 components. Raphides of calcium oxalate embedded in elliptical mucilage cells or scattered throughout, needle crystals 20 ~ 144μm long. Spiral vessels 10 ~ 24μm in diameter. (Fig 1)

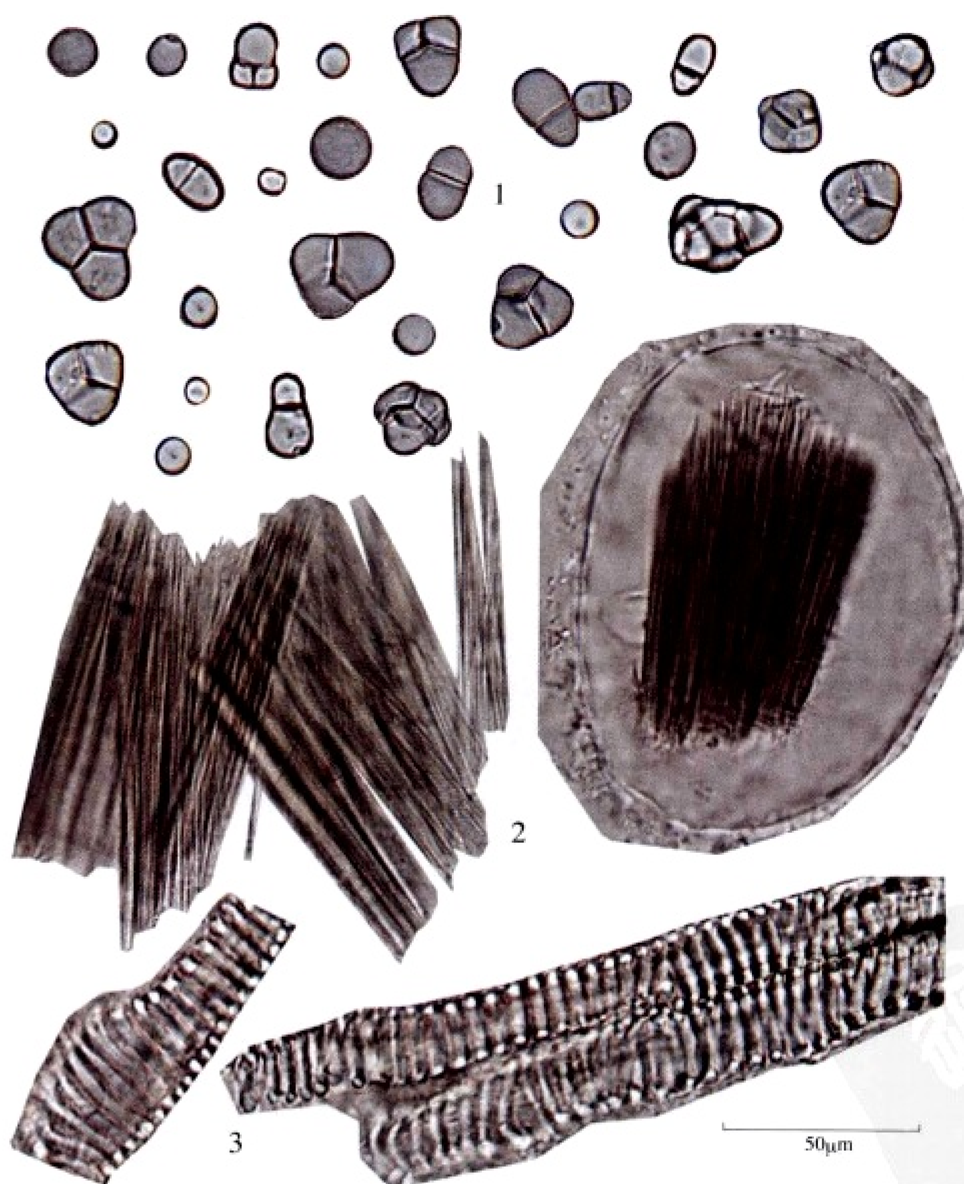


图1　半夏（*Pinellia ternata* 块茎）粉末

[Fig1　Powder of tuber from *Pinellia ternata*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶（Raphides of calcium oxalate）　3. 导管（Vessels）

附注：法半夏[显微特征]见半夏。

Note: The microscopic structure of Rhizoma Pinelliae Praeparatum as described under that of Rhizoma Pinelliae.

母 丁 香

Mudingxiang

FRUCTUS CARYOPHYLLI

本品为桃金娘科植物丁香 *Eugenia caryophyllata* Thunb. 的近成熟果实。

[显微特征] 本品粉末：棕褐色。淀粉粒众多，单粒长卵圆形、类贝壳形、类圆形或不规则形，直径14～35μm。纤维较多，成束或单个散在，淡黄棕色，多呈长梭形，直径约9～41μm。石细胞单个散在或数个成群，淡黄棕色，呈长条形、类三角形或不规则形，偶有分枝状，直径14～88μm，层纹较密，孔沟明显。草酸钙簇晶存在于薄壁细胞中，直径7～43μm。偶见草酸钙小方晶。油室多破碎。(图1)

Powder: Dark brown. Starch granules numerous, simple granules long ovoid, conchoidal, round or irregular shaped, 14～35 μm in diameter. Fibres visible, single or forming fibre bundles, pale yellowish-brown, long shuttle-shaped, 9～41 μm in diameter. Stone cells singly scattered or grouped, pale yellowish-brown, elongated, subtriangular or irregular shaped, and branched ones visible occasionally, 14～88 μm, with dense striations and distinct pit canals. Clusters of calcium oxalate occurring in the parenchymatous cells, 7～43 μm in diameter. Oil cavities frequently broken. (Fig 1)



图1 母丁香（*Eugenia caryophyllata* 近成熟果实）粉末

[Fig1 Powder of fruit from *Eugenia caryophyllata*]

1. 淀粉粒（Starch granules） 2. 石细胞（Stone cells） 3. 纤维（Fibres） 4. 草酸钙结晶（Clusters of calcium oxalate） 5. 油室（Oil cavities）

地　　龙

Dilong

PHERETIMA

本品为钜蚓科动物参环毛蚓*Pheretima aspergillum*（E. Perrier）、通俗环毛蚓*Pheretima vulgaris* Chen、威廉环毛蚓*Pheretima guillelmi*（Michaelsen）或栉盲环毛蚓*Pheretima pectinifera* Michaelsen的干燥体。

［显微特征］　本品粉末：淡灰色或灰黄色。斜纹肌纤维无色或淡棕色，肌纤维散在或相互绞结成片状，多稍弯曲，直径4～26μm，边缘常不整齐。表皮细胞呈棕黄色，细胞界限不明显，布有暗棕色的色素颗粒。刚毛少见，常碎断散在，淡棕色或黄棕色，直径24～32μm，先端多钝圆，有的表面可见纵裂纹。（图1）

Powder: Pale grey or greyish-yellow. Obliquely striated muscle fibres colourless or pale brown, muscle fibres scattered or twisted each other into flaky, mostly curved slightly, 4～26μm in diameter, margin usually uneven. Epidermal cells brownish-yellow, cell boundary indistinct, containing dark brown pigment granules. Setae rarely visible, usually broken and scattered, pale brown or yellowish-brown, 24～32μm in diameter, tip mostly blunt, some with longitudinal slits.（Fig 1）



图1　地龙（*Pheretima aspergillum* 全体）粉末

[Fig1　Powder of body from *Pheretima aspergillum*]

1. 斜纹肌纤维（Obliquely striated muscle fibres）　2. 表皮细胞（Epidermal cells）　3. 刚毛（Setae）

地 枫 皮

Difengpi

CORTEX ILLICII

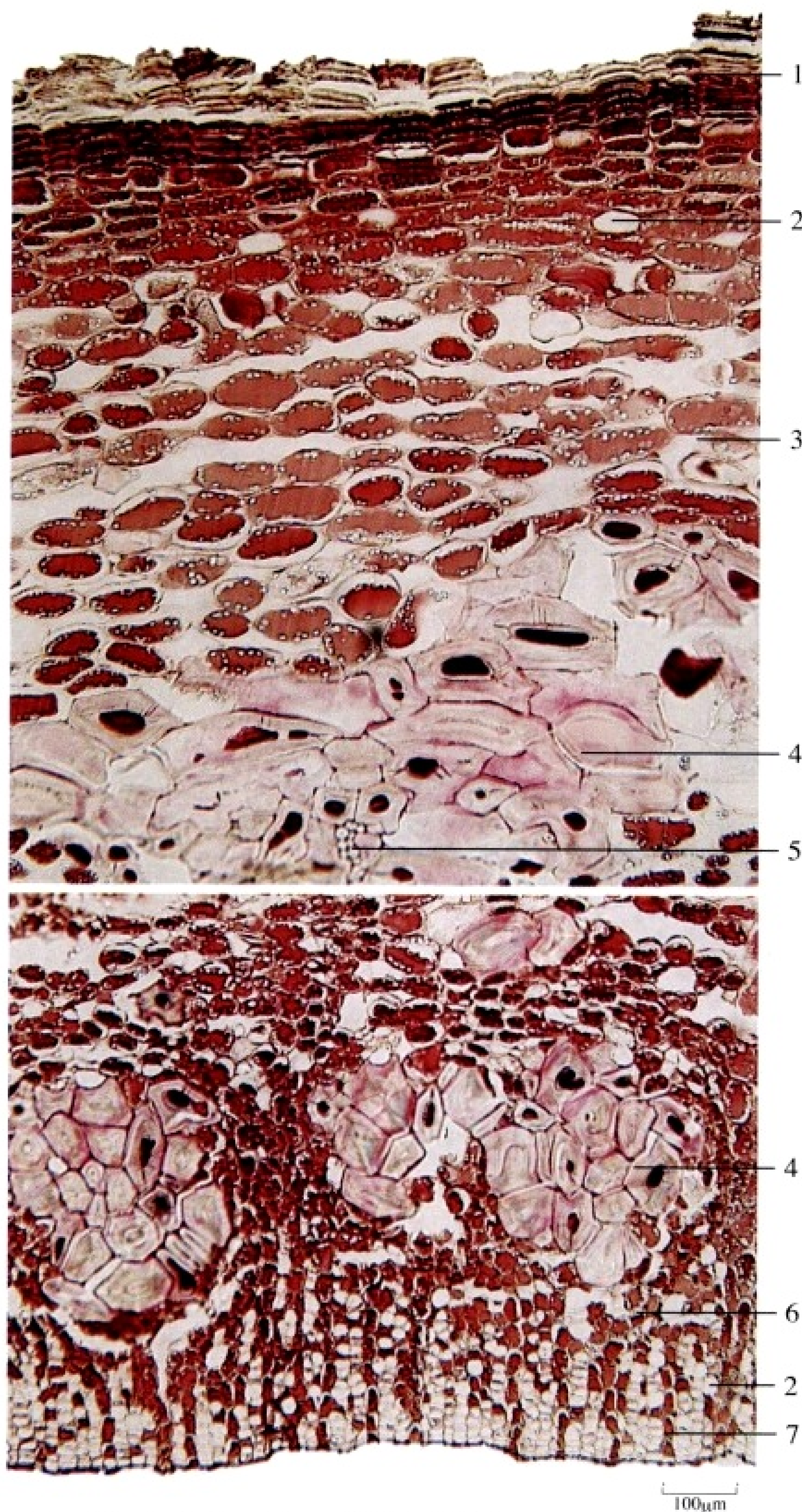


图1 地枫皮（*Illicium difengpi* 树皮）横切面

[Fig1 Transverse section of stem bark from *Illicium difengpi*]

1. 木栓层（Cork） 2. 分泌细胞（Secretory cells） 3. 皮层（Cortex）
4. 石细胞群（Groups of stone cells） 5. 纤维束（Fibre bundles）
6. 韧皮部（Phloem） 7. 韧皮射线（Phloem rays）

本品为木兰科植物地枫皮*Illicium difengpi* K. I. B. et K. I. M. 的干燥树皮。

[显微特征] 本品横切面：木栓层为数列细胞，其内壁较厚，含红棕色物。皮层散有石细胞群，其间嵌有少数纤维束；有分泌细胞分布。韧皮射线细胞1列；亦有分泌细胞，较皮层处为小。薄壁细胞含有红棕色物和淀粉粒。（图1、2）

Transverse section: Cork consisting of several layers of cells, the inner walls relatively thickened, containing reddish-brown substances. Cortex scattered with groups of stone cells, parquet with a few fibre bundles; secretory cells present. Phloem rays 1 cell wide, also occurring secretory cells, but smaller than those in cortex. Parenchymatous cells containing reddish-brown substances and starch granules. (Fig 1, 2)



图2 示石细胞群嵌有少数纤维束

[Fig2 Showing groups of stone cell parqueted with fibre bundles]

地 肤 子

Difuzi

FRUCTUS KOCHIAE

本品为藜科植物地肤*Kochia scoparia*（L.）Schrad. 的干燥成熟果实。

[显微特征] 本品粉末：棕褐色。花被表皮细胞多角形，气孔不定式；薄壁细胞中含草酸钙簇晶。果皮细胞呈类长方形或多边形，壁薄，波状弯曲，含众多草酸钙小方晶。种皮细胞棕褐色，呈多角形或类方形，多皱缩。（图1）

Powder: Brown. Epidermal cells of perianth polygonal, stomata anomocytic, parenchymatous cells containing clusters of calcium oxalate. Pericarp cells subrectangular or polygonal, thin-walled, sinuous, containing numerously small prisms of calcium oxalate. Testa cells brown, polygonal or subsquare, mostly crumpled.（Fig 1）

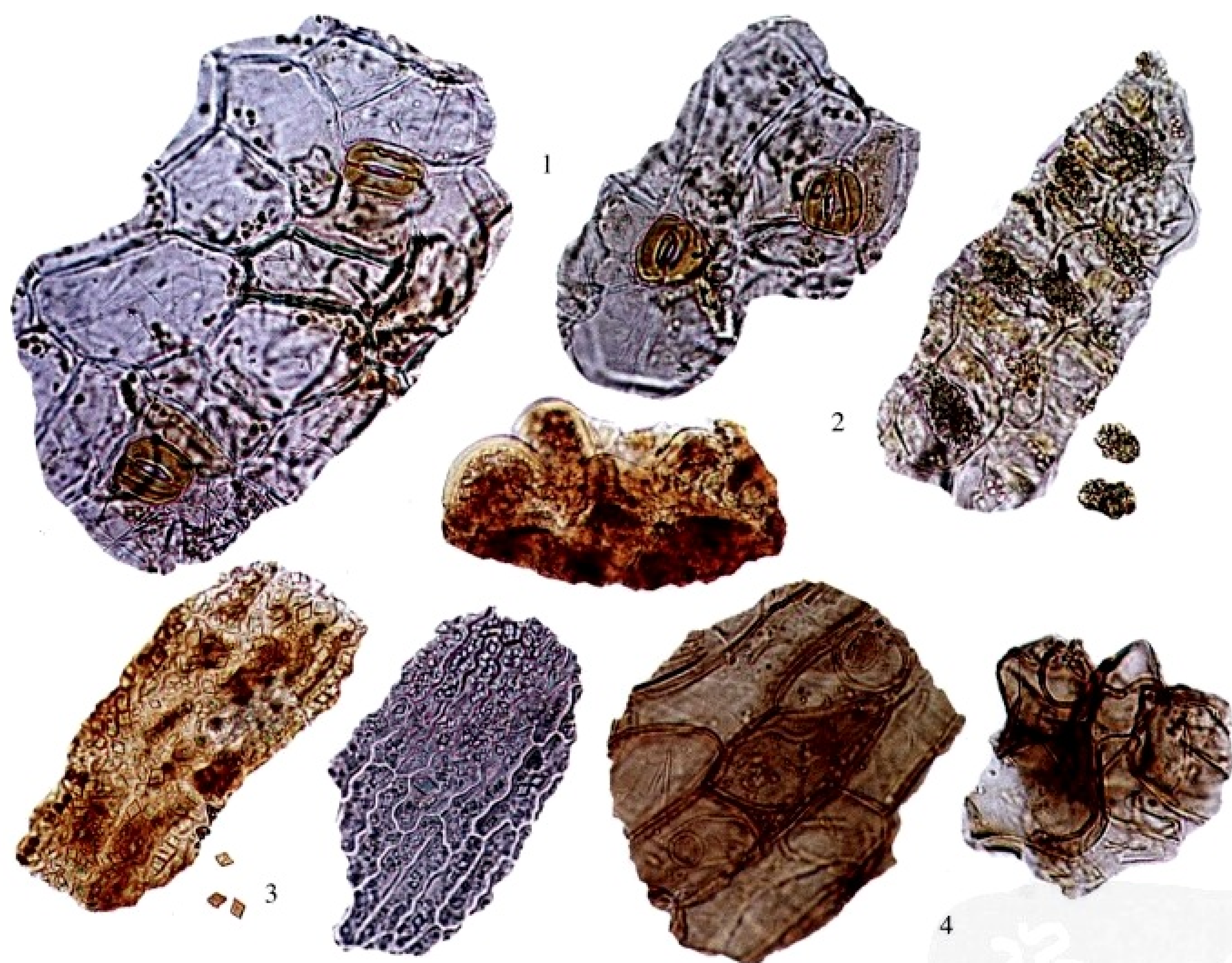


图1 地肤子（*Kochia scoparia* 果实）粉末

[Fig1 Powder of fruit from *Kochia scoparia*]

1. 花被表皮细胞（Epidermal cells of perianth） 2. 薄壁细胞含草酸钙簇晶（Parenchymatous cells containing clusters of calcium oxalate） 3. 果皮细胞（Pericarp cells） 4. 种皮细胞（Testa cells）

地　骨　皮

Digupi

CORTEX LYCII

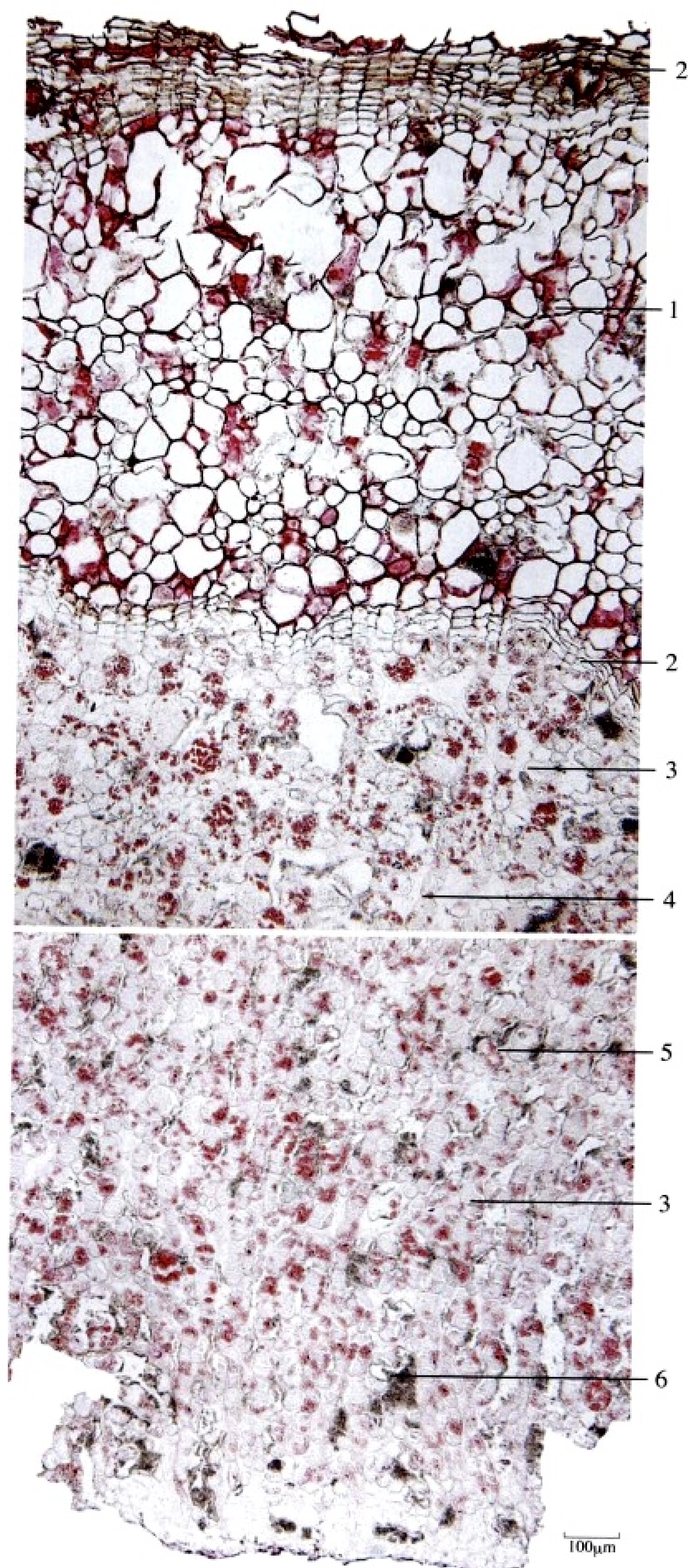


图1　地骨皮（*Lycium chinense* 根皮）横切面

[Fig1　Transverse section of root bark from *Lycium chinense*]

1. 落皮层（Rhytidome）　2. 木栓层（Cork）　3. 韧皮部（Phloem）
4. 韧皮射线（Phloem rays）　5. 韧皮纤维（Phloem fibres）　6. 薄壁细胞含草酸钙砂晶（Parenchymatous cells containing sandy crystals of calcium oxalate）

本品为茄科植物枸杞*Lycium chinense* Mill.或宁夏枸杞*Lycium barbarum* L.的干燥根皮。

[显微特征] 本品横切面：木栓层为4～10余列细胞，其外有较厚的落皮层。韧皮射线大多宽1列细胞；纤维单个散在或2至数个成束。薄壁细胞含草酸钙砂晶，并含多数淀粉粒。（图1、2）

Transverse section: Cork consisting of 4 ~ 10 or more layers of cells, with relatively thick rhytidome outside. Most phloem rays 1 cell wide; fibres singly scattered, or 2 to several in bundles. Parenchymatous cells containing sandy crystals of calcium oxalate and numerous starch granules. (Fig 1, 2)

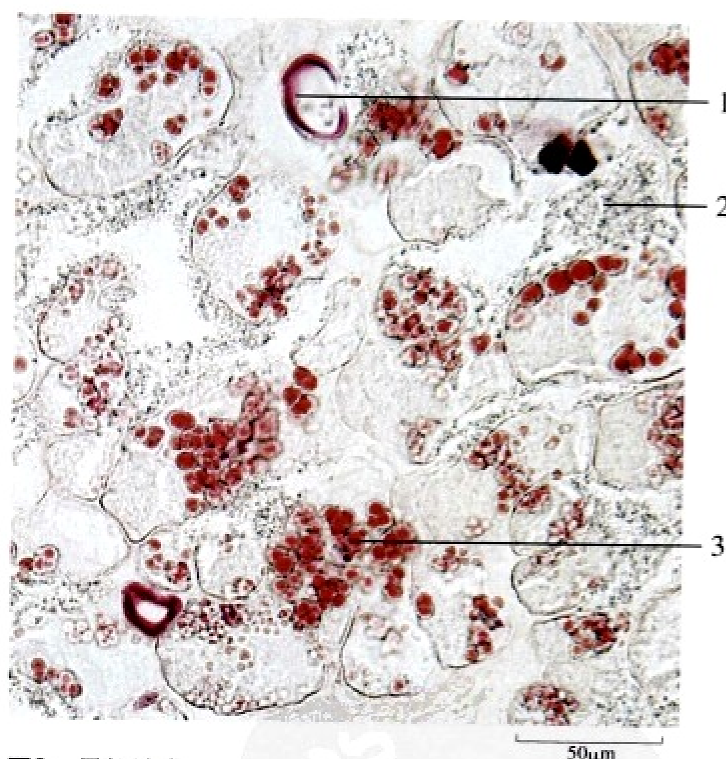


图2　局部放大

[Fig2　Partial tissue magnified]

1. 韧皮纤维（Phloem fibres）　2. 草酸钙砂晶（Sandy crystals of calcium oxalate）　3. 淀粉粒（Starch granules）

地　　黄

Dihuang

RADIX REHMANNIAE

本品为玄参科植物地黄*Rehmannia glutinosa* Libosch. 的新鲜或干燥块根。

[显微特征]　本品横切面: 木栓细胞数列。栓内层薄壁细胞排列疏松；散有较多分泌细胞，含橙黄色油滴；偶有石细胞。韧皮部较宽，分泌细胞较少。形成层成环。木质部射线宽广；导管稀疏，排列成放射状。(图1、2)

Transverse section: Cork consisting of several layers of cells. In phelloderm parenchymatous cells loosely arranged; scattered with more secretory cells containing orange yellow oil droplets; stone cells occasionally found. Phloem relatively broad, secretory cells less. Cambium in a ring. Xylem rays broad, vessels sparse, arranged radially. (Fig 1,2)

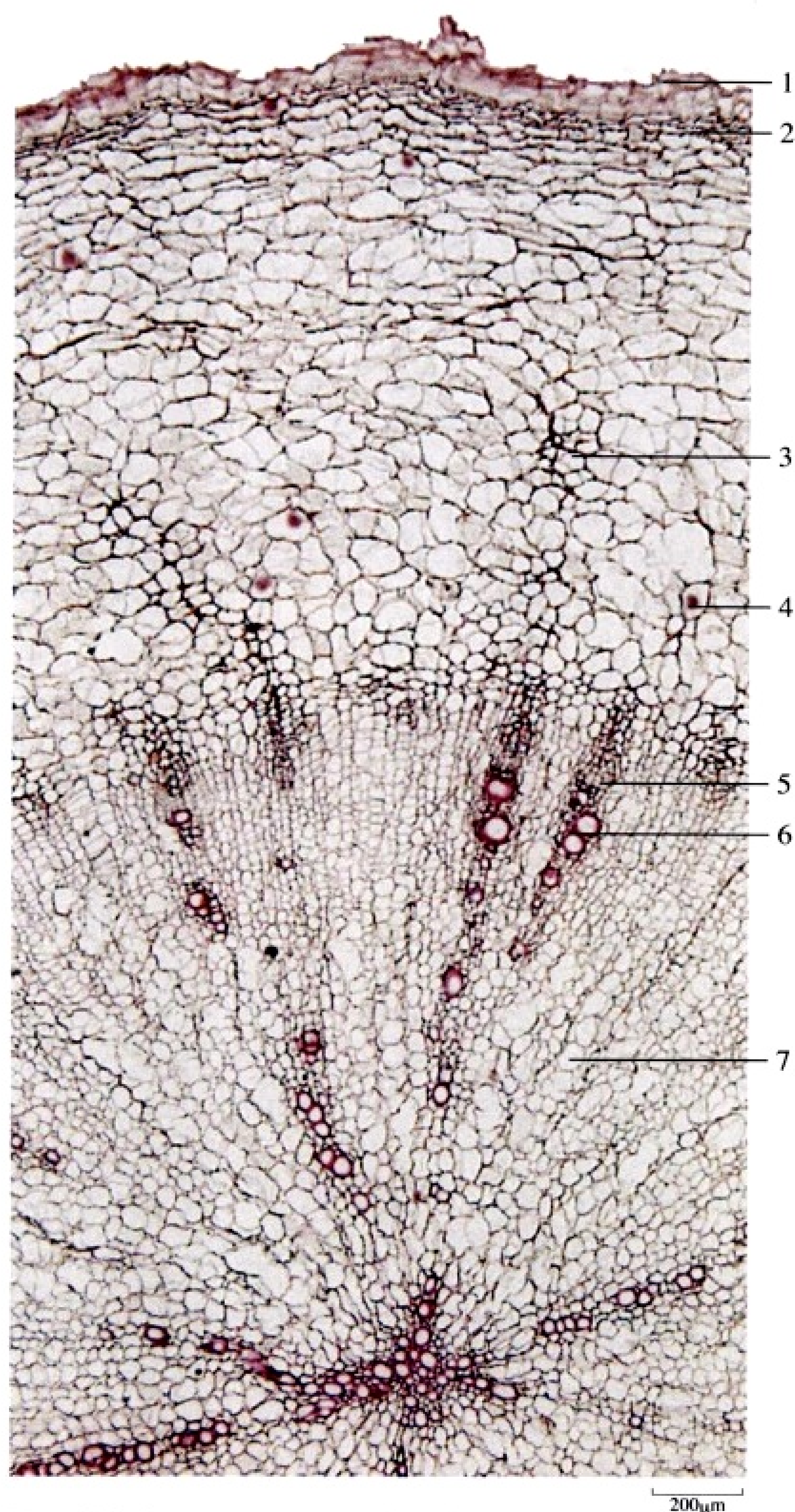


图1　地黄（*Rehmannia glutinosa* 块根）横切面

[Fig1　Transverse section of root tuber from *Rehmannia glutinosa*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮部（Phloem）　4. 分泌细胞（Secretory cells）　5. 形成层（Cambium）　6. 木质部（Xylem）　7. 木射线（Xylem rays）

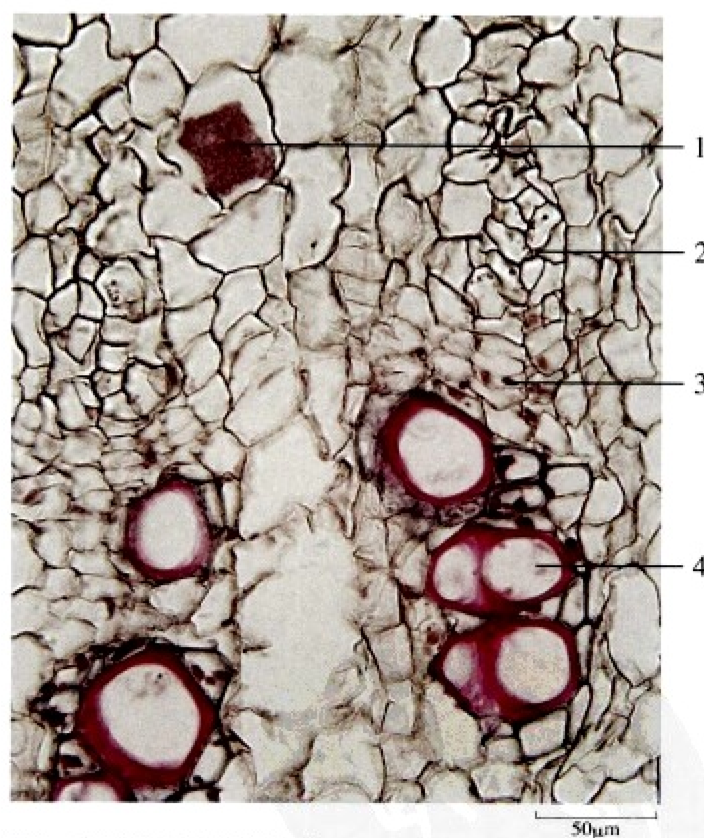


图2　韧皮部与木质部放大

[Fig2　Phloem and xylem magnified]

1. 分泌细胞（Secretory cells）　2. 韧皮部筛管群（Sieve tube groups of phloem）　3. 形成层（Cambium）　4. 木质部导管（Xylem vessels）

生地黄粉末：深棕色。木栓细胞淡棕色。薄壁细胞类圆形，内含类圆形核状物。分泌细胞形状与一般薄壁细胞相似，内含橙黄色或橙红色油滴状物。具缘纹孔导管及网纹导管直径约至92μm。（图3）

Powder: Dark brown. Cork cells brownish. Parenchymatous cells subrounded, containing subrounded nuclei-like substance. Secretory cells mostly similar to parenchymatous cells in shape, containing orange or orange red oil droplets. Bordered pitted and reticulated vessels up to about 92 μm in diameter.（Fig 3）



图3　生地黄（*Rehmannia glutinosa* 块根）粉末

[Fig3　Powder of root tuber from *Rehmannia glutinosa*]

1. 木栓细胞（Cork cells）　2. 薄壁细胞内含类圆形核状物（Fragments of parenchymatous cells, showing nuclei-like substance）　3. 分泌细胞[Secretory cells（3a. 鲜地黄中的分泌细胞secretory cells of fresh Radix Rehmanniae）]
4. 导管（Vessels）

地　　榆

Diyu

RADIX SANGUISORBAE

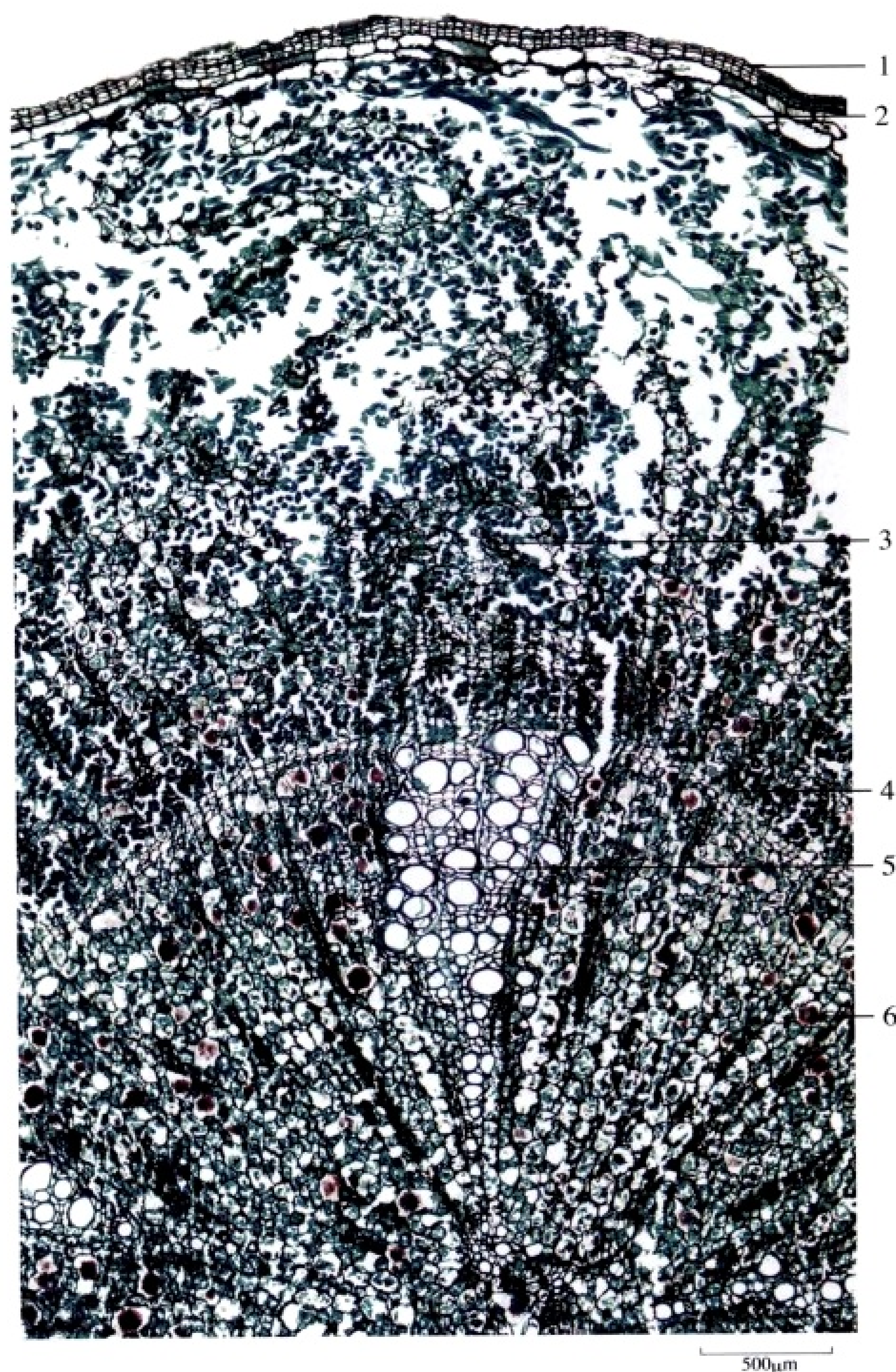


图1　地榆（*Sanguisorba officinalis* 根）横切面

[Fig1　Transverse section of root from *Sanguisorba officinalis*]

1. 木栓层（Cork layer）　2. 栓内层（Phelloderm）　3. 韧皮部（Phloem）
4. 形成层（Cambium）　5. 木质部（Xylem）　6. 草酸钙簇晶（Clusters of calcium oxalate）

本品为蔷薇科植物地榆*Sanguisorba officinalis* L. 或长叶地榆*Sanguisorba officinalis* L. var. *longifolia*（Bert.）Yü et Li 的干燥根。

[显微特征] 本品根的横切面：地榆　木栓层为数列棕色细胞；栓内层细胞长圆形；韧皮部有裂隙，形成层环明显；木质部导管径向排列，纤维非木化，初生木质部明显。薄壁细胞内含多数草酸钙簇晶、细小方晶及淀粉粒。（图1、2）

Transverse section: Root of *Sanguisorba officinalis* Cork consisting of several layers of brown cells. Phelloderm cells oblong. Phloem broad with cracks. Cambium ring distinct. Xylem vessels arranged radially, fibres non-lignified, primary xylem distinct. Parenchymatous cells containing clusters and fine prisms of calcium oxalate as well as starch granules.（Fig 1, 2）

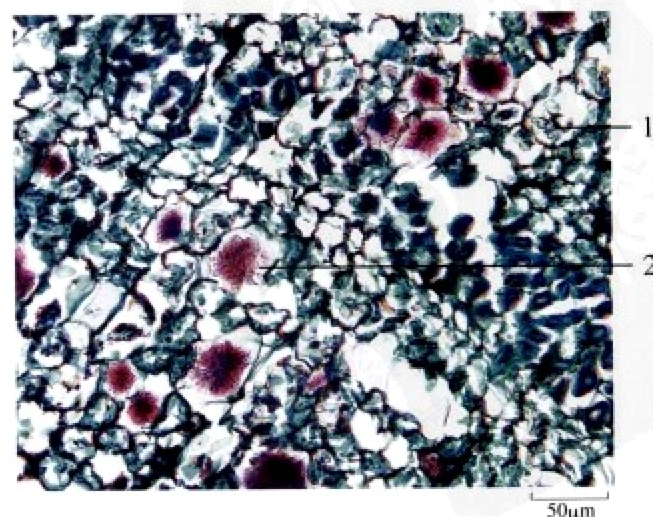


图2　示薄壁细胞含淀粉粒和草酸钙簇晶

[Fig2　Showing starch granules and clusters of calcium oxalate]

1. 淀粉粒（Starch granules）　2. 草酸钙簇晶（Clusters of calcium oxalate）

长叶地榆 栓内层内侧与韧皮部有众多的单个或成束的纤维，韧皮射线明显；木质部纤维少。（图3、4）

Root of *Sanguisorba officinalis* var. *longifolia* Numerous fibres, singly or grouped, existed in the inside of cortex and phloem. Phloem rays distinct. Xylem fibres infrequent.（Fig 3,4）

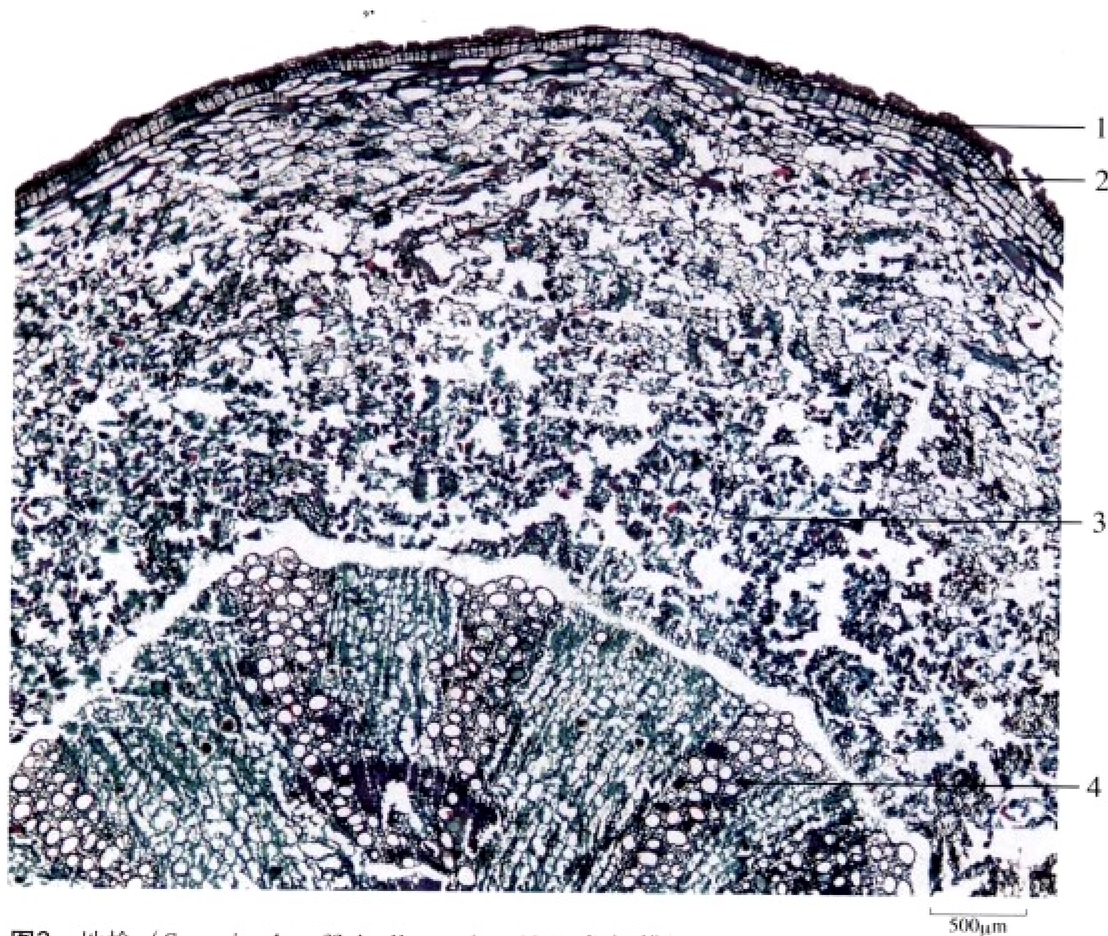


图3 地榆（*Sanguisorba officinalis* var. *longifolia* 根）横切面
[Fig3 Transverse section of root from *Sanguisorba officinalis* var. *longifolia*]
1. 木栓层（Cork layer） 2. 栓内层（Phelloderm） 3. 韧皮部（Phloem） 4. 木质部（Xylem）

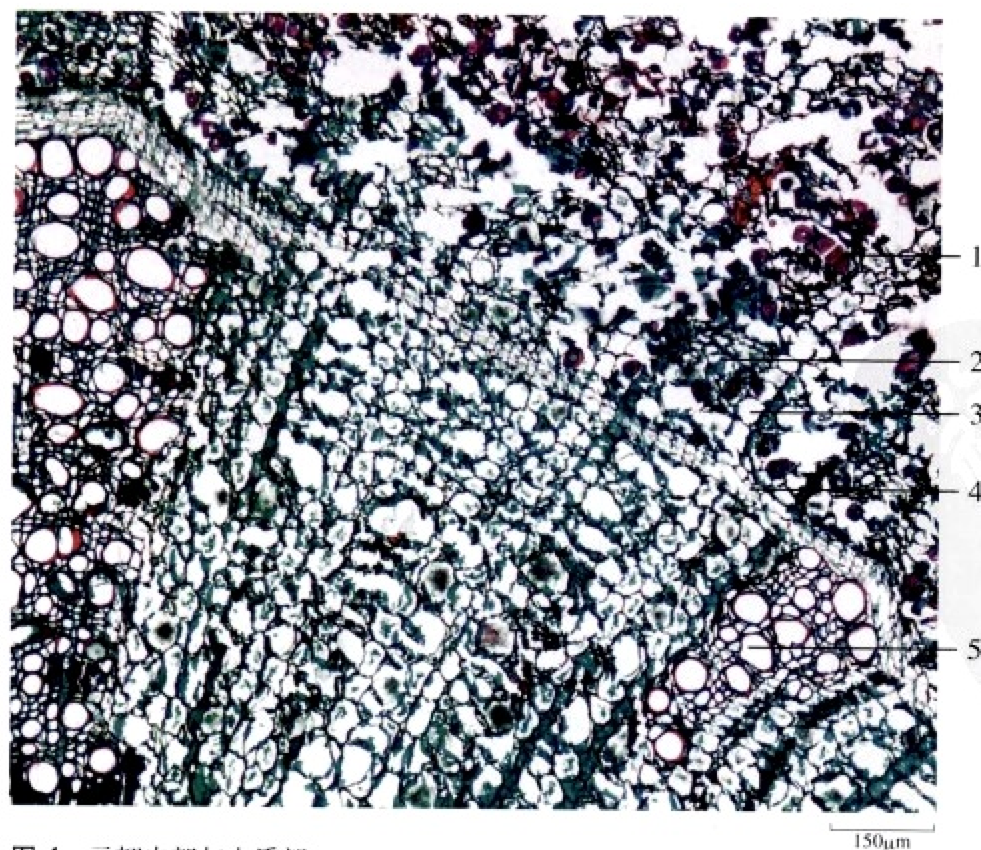


图 4 示韧皮部与木质部
[Fig4 Showing phloem and xylem]
1. 韧皮纤维（Phloem fibres） 2. 韧皮部（Phloem） 3. 韧皮射线（Phloem rays）
4. 形成层（Cambium） 5. 木质部（Xylem）

地榆粉末：灰黄色至土黄色。草酸钙簇晶众多，棱角较钝，直径18～65μm。淀粉粒众多，多单粒，长11～25μm，直径3～9μm，类圆形、广卵形或不规则形，脐点多为裂缝状，层纹不明显。木栓细胞黄棕色，长方形，有的胞腔内含黄棕色块状物或油滴状物。导管多为网纹导管和具缘纹孔导管，直径13～60μm。纤维较少，单个散在或成束，细长，直径5～9μm，非木化，孔沟不明显。草酸钙方晶直径5～20μm。(图5)

Powder of root of *Sanguisorba officinalis* Greyish-yellow to brownish yellow. Clusters of calcium oxalate numerous, with obtuse angles, 18 ~ 65 μm in diameter. Starch granules numerous, mostly single granules, 11 ~ 25 μm long, 3 ~ 9 μm in diameter, subrounded, broad ovate or irregular, hilum mostly slit-shaped, striations indistinct. Cork cells yellowish-brown, rectangular, some lumina containing yellowish-brown masses or oily dripped contents. Vessels mostly reticulated or bordered pitted thickened, 13 ~ 60 μm in diameter. Fibers relatively less, singly or grouped, slender, 5 ~ 9 μm in diameter, non-lignified, pits indistinct. Prisms of calcium oxalate 5 ~ 20 μm in diameter. (Fig 5)



图5 地榆（*Sanguisorba officinalis* 根）粉末

[Fig5 Powder of root from *Sanguisorba officinalis*]

1. 草酸钙簇晶（Clusters of calcium oxalate） 2. 淀粉粒（Starch granules） 3. 木栓细胞（Cork cells） 4. 导管（Vessels） 5. 纤维（Fibres） 6. 草酸钙方晶（Prisms of calcium oxalate）

长叶地榆: 粉末红棕色。韧皮纤维众多，单个散在或成束，壁厚，直径7～26μm，较长，非木化。（图6）

Powder of root of *Sanguisorba officinalis* var. *longifolia* Reddish brown. Phloem fibers numerous, single or grouped, walls thickened, 7～26 μm in diameter, relatively long, non-lignified.（Fig.6）



图6 地榆（*Sanguisorba officinalis* var. *longifolia* 根）粉末
[Fig6 Phloem fibres of root from *Sanguisorba officinalis* var *longifolia*]
示韧皮纤维（Showing phloem fibres）

地　锦　草

Dijincao

HERBA EUPHORBIAE HUMIFUSAE

本品为大戟科植物地锦*Euphorbia humifusa* Willd. 或斑地锦*Euphorbia maculata* L. 的干燥全草。

[显微特征] 本品粉末：绿褐色。叶表皮细胞外壁呈乳头状突起。叶肉组织中，细脉末端周围的细胞放射状排列。非腺毛 3～8细胞，直径约14μm，多碎断。(图1)

Powder: Greenish-brown. Outer walls of the leaf epidermal cells papillary. Surrounding cells of the fine vein ends in mesophyll arranged radiately. Non-glandular hairs 3～8 celled, about 14 μm in diameter, mostly broken.（Fig 1）



图1　地锦草（*Euphorbia humifusa* 全草）粉末

[Fig1　Powder of herb from *Euphorbia humifusa*]

1. 叶表皮细胞 [Leaf epidermal cells（示细胞外壁乳头状突起 Showing outer walls papilla-shaped）]
2. 叶肉组织 [Mesophyll tissue（示细脉末端周围细胞 Showing surrounding cells of the ends of fine veins）]
3. 非腺毛（Non-glandular hairs）

亚乎奴（锡生藤）

Yahunu

HERBA CISSAMPELOTIS

本品系傣族习用药材。为防己科植物锡生藤*Cissampelos pareira* L. var. *hirsuta*（Buch. ex DC.）Forman的干燥全株。

[显微特征] 本品粉末：灰棕色。淀粉粒甚多，单粒圆形、半圆形或多角形，直径2～21μm，脐点点状或裂缝状；复粒由2～4分粒组成。石细胞多，淡黄色，类方形、椭圆形或多角形，直径30～65μm；另有类梭形，长80～180μm。具缘纹孔导管直径24～140μm。纤维细长，可至1000μm，直径约24μm，壁厚，木化。草酸钙方晶较少，极细小。非腺毛1～5细胞，长220～1260μm。（图1）

Powder: Greyish brown. Starch granules abundant, simple grains rounded, semirounded or polygonal, 2～21 μm in diameter, hilum pointed or cleft; compound granules of 2～4 components. Stone cells numerous, pale yellow, subsquare, elliptical or polygonal, 30～65 μm in diameter; and subfusiform, 80～180 μm long. Bordered pitted vessels 24～140 μm in diameter. Fibres slender, up to 1000 μm long, about 24 μm in diameter, walls thickened and lignified. Prisms of calcium oxalate relatively fewer and fine. Non-glandular hairs 1～5 celled, 220～1260 μm long.（Fig 1）

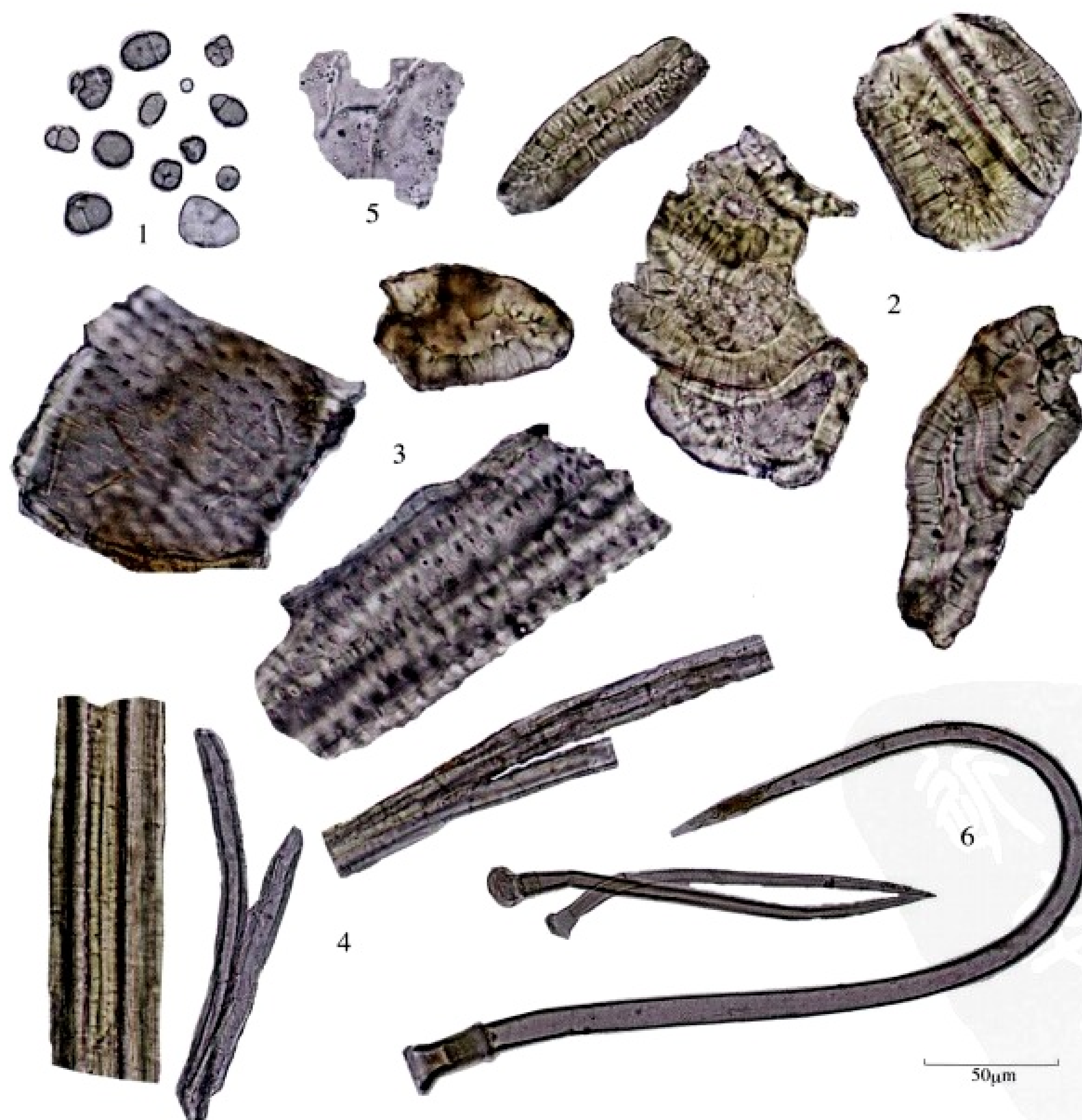


图1 亚乎奴（*Cissampelos pareira* var. *hirsuta* 全株）粉末

[Fig1 Powder of herb from *Cissampelos pareira* var. *hirsuta*]

1. 淀粉粒（Starch granules） 2. 石细胞（Stone cells） 3. 具缘纹孔导管（Bordered pitted vessels） 4. 纤维（Fibres）
5. 草酸钙方晶（Prisms of calcium oxalate） 6. 非腺毛（Non-glandular hairs）

亚 麻 子

Yamazi

SEMEN LINI

本品为亚麻科植物亚麻*Linum usitatissimum* L. 的干燥成熟种子。

[显微特征] 本品横切面：表皮细胞较大，类长方形，壁含黏液质，遇水膨胀显层纹，外面有角质层。下皮为1～5列薄壁细胞，壁稍厚。纤维层为1列排列紧密的纤维细胞，略径向延长，直径3～5μm，壁厚，木化，胞腔较窄，层纹隐约可见。颓废层细胞不明显。色素层为一层扁平薄壁细胞，内含棕红色物质。胚乳及子叶细胞多角形，内含脂肪油及糊粉粒。糊粉粒直径7～14μm，含拟晶体及拟球体1～2个。（图1、2）

Transverse section: Epidermal cells relatively large, subrectangular, walls containing mucilage, swelling and showing striations when contacted with water, externally covered with cuticle. Hypodermis consisting of 1～5 layers of parenchymatous cells, with slightly thickened walls. Fibre layer consisting of 1 layer of fiber cells, arranging closely, slightly prolonged radially, 3～5 μm in diameter, walls thickened and lignified, lumina relatively narrow, striations indistinctly visible. Cells of decadent layer indistinct. Pigment layer consisting of 1 layer of flattened parenchymatous cells, containing brownish-red contents. Cells of endosperm and cotyledons polygonal, containing fatty oil and aleurone grains. Aleurone grains 7 ～ 14 μm in diameter, containing 1 ～ 2 crystalloids and globoids.（Fig 1, 2）

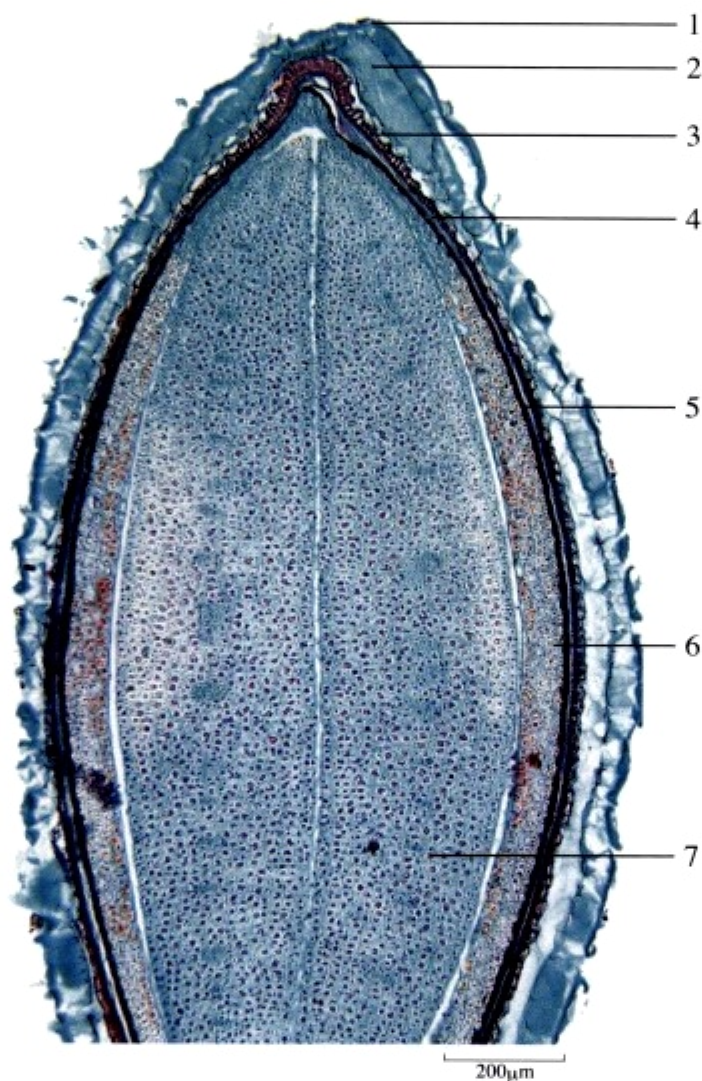


图1 亚麻子（*Linum usitatissimum* 种子）横切面

[Fig1 Transverse section of seed from *Linum usitatissimum*]

1. 种皮表皮细胞（Epidermal cells of seed coat） 2. 下皮细胞（Hypodermal cells） 3. 纤维层细胞（Cells of fibre layer） 4. 颓废层（Decadent layer） 5. 色素层（Pigment layer） 6. 胚乳细胞（Endosperm cells） 7. 子叶细胞（Cotyledon cells）

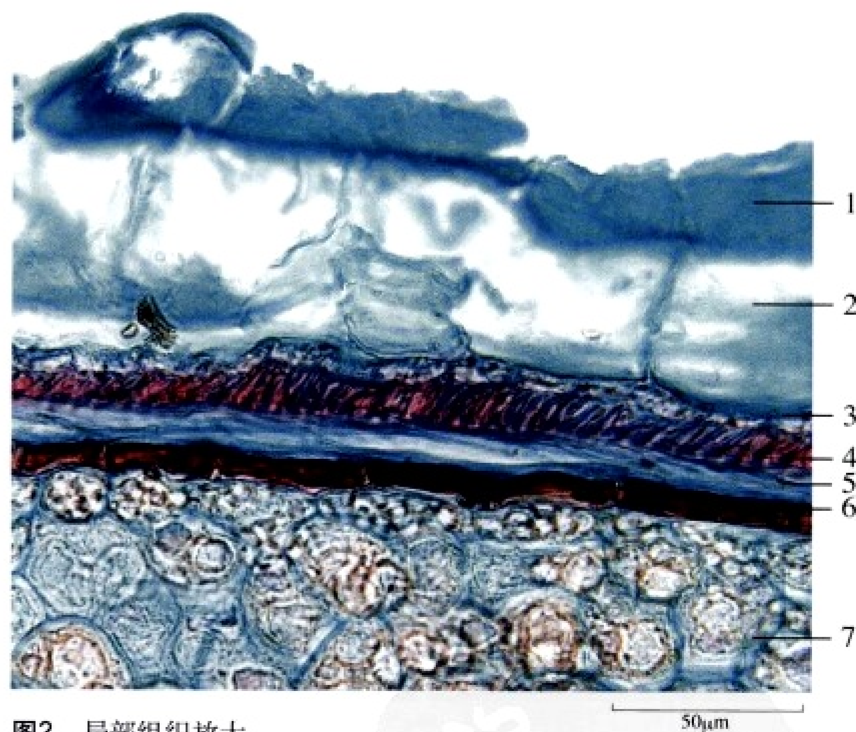


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 角质层（Cutical layer） 2. 表皮细胞（Epidermal cells） 3. 下皮细胞（Hypodermal cells） 4. 纤维层（Fibre layer） 5. 颓废层（Decadent layer） 6. 色素层（Pigment layer） 7. 胚乳细胞（Endosperm cells）

西 红 花

Xihonghua

STIGMA CROCI

本品为鸢尾科植物番红花*Crocus sativus* L. 的干燥柱头。

[显微特征] 本品粉末：橙红色。表皮细胞表面观长条形，壁薄，微弯曲，有的外壁凸出呈乳头状或绒毛状，表面隐约可见纤细纹理。柱头顶端表皮细胞绒毛状，直径26～56μm，表面有稀疏纹理。草酸钙结晶聚集于薄壁细胞中，呈颗粒状、圆簇状、梭形或类方形，直径2～14μm。（图1）

Powder: Orange-red. Epidermal cells long stripe-shaped in surface view, thin-walled, slightly sinuous, sometimes the outer walls protruding and showing papillae, with indistinct fine striations. Terminal epidermal cells of stigma villiform, 26 ~ 56 μm in diameter, with sparse stritations on surface. Crystals of calcium oxalate aggregated in parenchymatous cells, granular, round-fascicled, fusiform or subsquare, 2 ~ 14 μm in diameter. (Fig 1)



图1 西红花（*Crocus sativus* 柱头）粉末

[Fig1 Powder of stigma from *Crocus sativus*]

1. 表皮细胞（Epidermal cells） 2. 柱头顶端表皮细胞（Terminal epidermal cells of stigma）
3. 草酸钙结晶（Crystals of calcium oxalate） 4. 花粉粒（Pollen grains）

百　　部
Baibu
RADIX STEMONAE

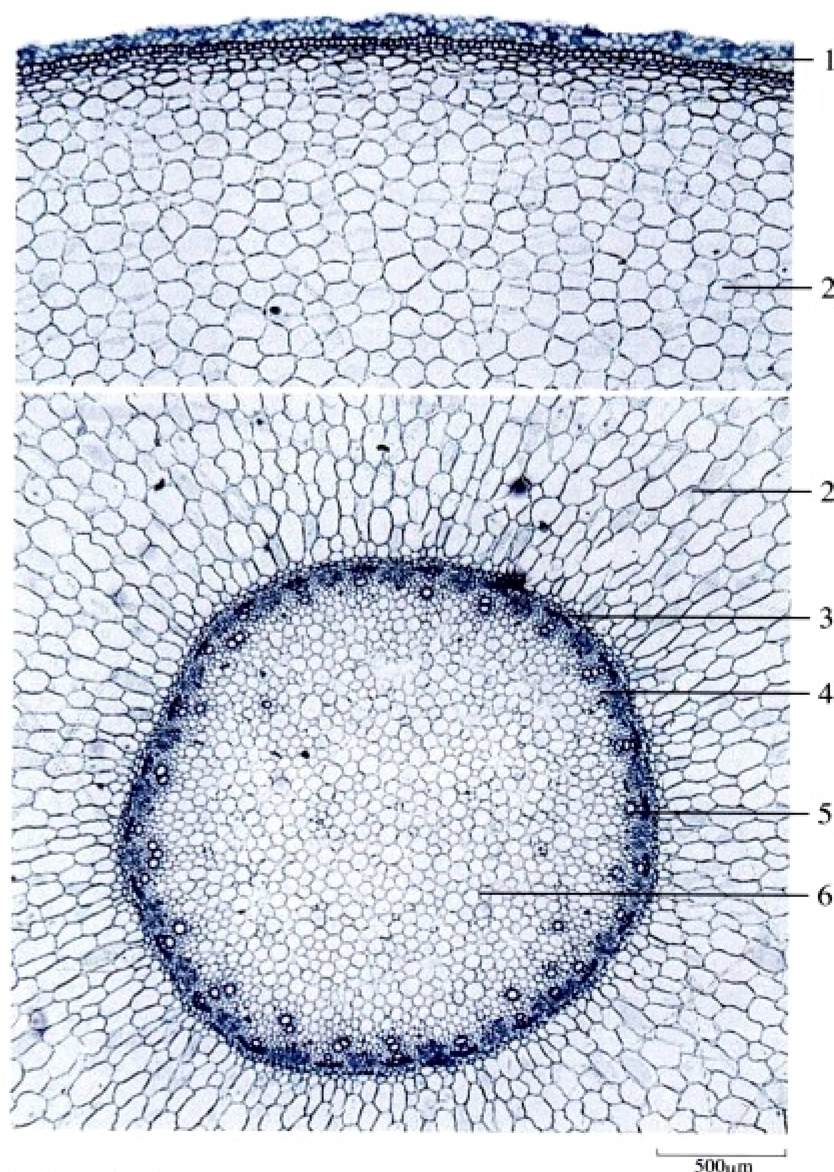


图1　百部（*Stemona sessilifolia* 块根）横切面

[Fig1　Transverse section of root tuber from *Stemona sessilifolia*]

1. 根被（Velamen）　2. 皮层（Cortex）　3. 内皮层（Endodermis）　4. 韧皮部（Phloem）　5. 木质部（Xylem）　6. 髓（Pith）

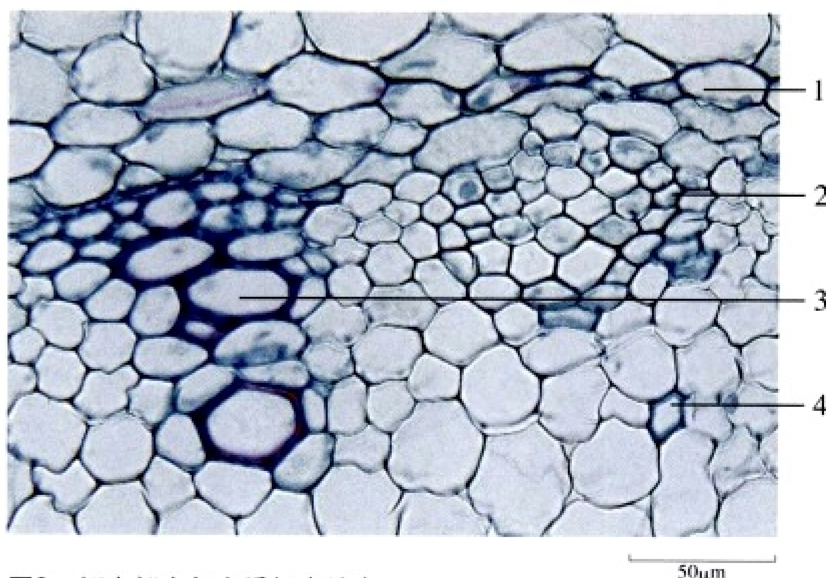


图3　韧皮部束与木质部束放大

[Fig3　Phloem bundles and xylem bundles magnified]

1. 内皮层（Endodermis）2. 韧皮部筛管（Sieve tubes of phloem）　3. 木质部导管（Vessels of xylem）　4. 纤维（Fibres）

本品为百部科植物直立百部*Stemona sessilifolia*（Miq.）Miq.、蔓生百部*Stemona japonica*（Bl.）Miq. 或对叶百部*Stemona tuberosa* Lour. 的干燥块根。

[显微特征] 本品横切面：直立百部　根被为3～4列细胞，壁木栓化及木化，具致密的细条纹。皮层较宽。中柱韧皮部束与木质部束各19～27个，间隔排列，韧皮部束内侧有少数非木化纤维；木质部束导管2～5个，并有木纤维及管胞，导管类多角形，径向直径约至48μm，偶有导管深入至髓部。髓部散有少数细小纤维。（图1～3）

Transverse section: Root of *Stemona sessilifolia* Velamen of 3 ~ 4 layers of cells, walls suberized and lignified with dense and fine striations. Cortex relatively broad. In stele phloem bundles and xylem bundles 19 ~ 27, respectively, arranged alternatively, with a few non-lignified fibres in the inner side of phloem bundles; xylem bundles with 2 ~ 5 vessels, xylem fibres and tracheids,vessels subpolygonal, 48 μm in diameter, radially, occasionally penetrating into the pith. A few small fibres scattered in pith.（Fig 1 ~ 3）

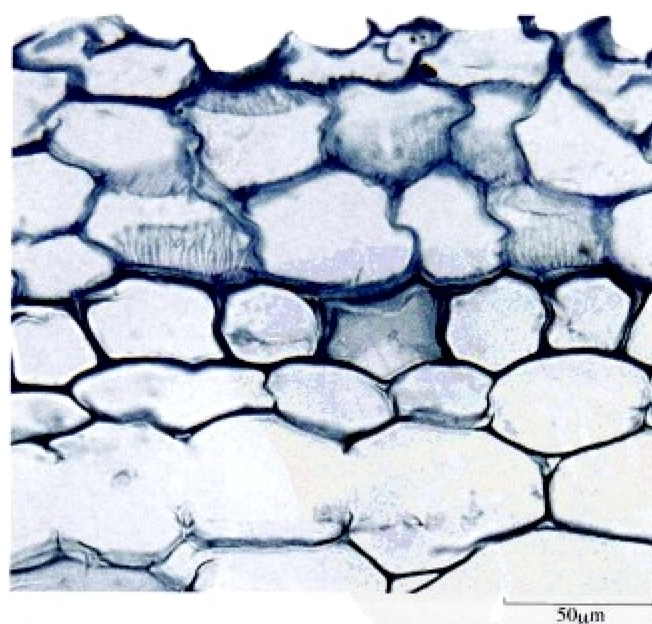


图2　根被放大，示细条纹

[Fig2　Velamen cells magnified, showing fine striations]

蔓生百部　根被为3～6列细胞。韧皮部纤维木化。导管径向直径约至184μm，通常深入至髓部，与外侧导管束作2～3轮排列。（图4～6）

Root of *Stemona japonica* Velamen of 3 ~ 6 layers of cells. Phloem fibres lignified. Vessels up to 184 μm in diameter, radially, usually penetrating into pith, arranged in 2 ~ 3 whorls.（Fig 4 ~ 6）

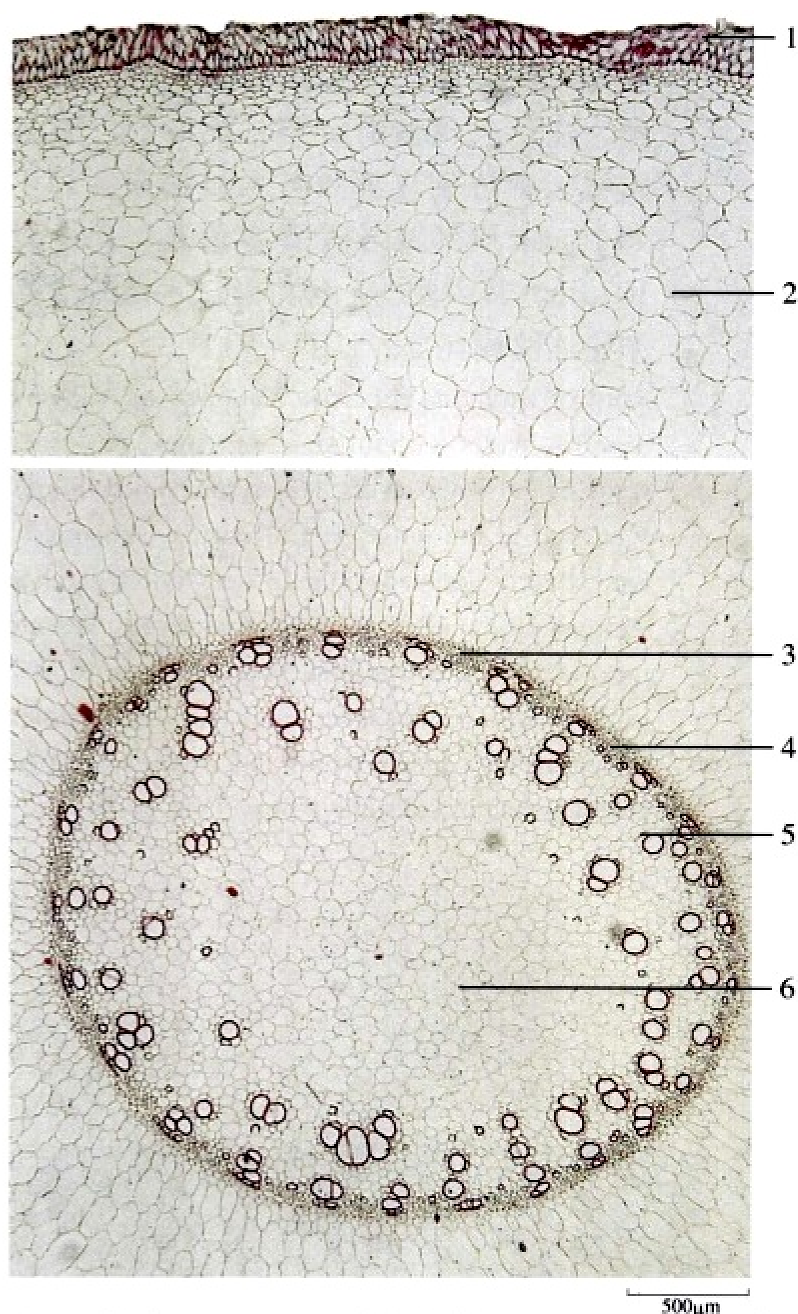


图4　百部（*Stemona japonica* 块根）横切面

[Fig4　Transverse section of root tuber from *Stemona japonica*]

1. 根被（Velamen）　2. 皮层（Cortex）　3. 内皮层（Endodermis）
4. 韧皮部（Phloem）　5. 木质部（Xylem）　6. 髓（Pith）



图6　示韧皮部束与木质部束

[Fig6　Showing phloem bundle and xylem bundle]

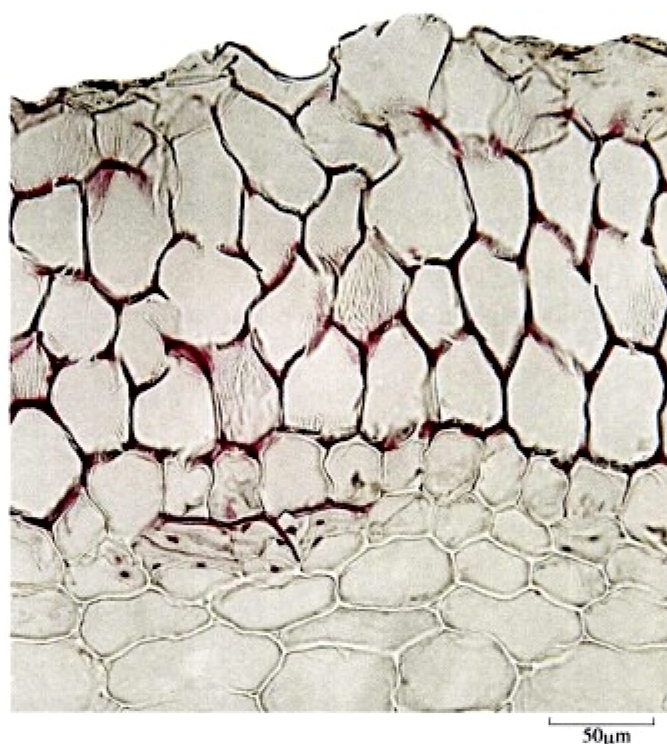


图5　示根被

[Fig5　Showing velamen]

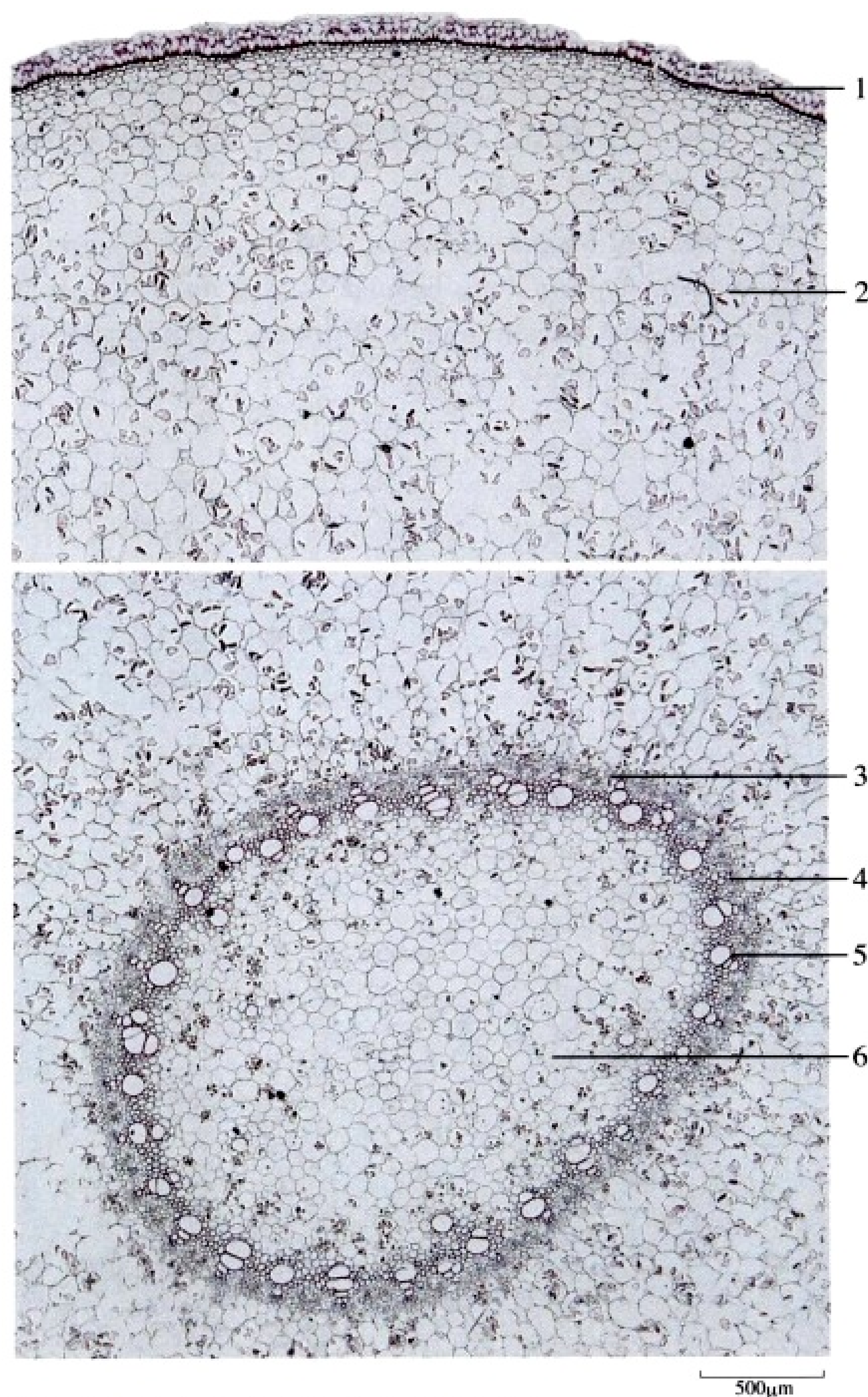


图7 百部（*Stemona tuberosa* 块根）横切面

[Fig7 Transverse section of root tuber from *Stemona tuberosa*]

1. 根被（Velamen） 2. 皮层（Cortex） 3. 内皮层（Endodermis）
4. 韧皮部（Phloem） 5. 木质部（Xylem） 6. 髓（Pith）

对叶百部 根被细胞为3列细胞，细胞壁无细条纹，其最内层细胞的内壁特厚。皮层外侧散有纤维，类方形，壁微木化。中柱韧皮部束与木质部束各32～40个。木质部束导管圆多角形，直径至107μm，其内侧与木纤维及微木化的薄壁细胞连接成环层。（图7～9）

Root of *Stemona tuberosa* Velamen of 3 layers of cells, walls without fine striations, the inner walls of the inner layers heavily thickened. Fibres scattered in the outer part of cortex, subsquare, with slightly lignified walls. In stele xylem bundles and phloem bundles 32 ~ 40 respectively. Vessels in xylem bundles rounded polygonal, up to 107 μm in diameter. The inner sides of xylem bundles linked up with xylem fibres and slightly lignified parenchymatous cells into a ring.（Fig 7～9）

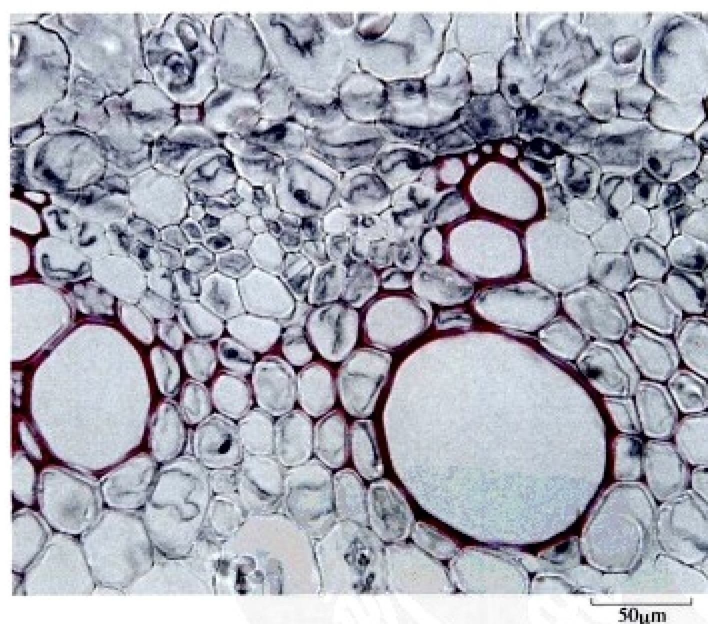


图9 示韧皮部束与木质部束

[Fig9 Showing phloem bundles and xylem bundles]



图8 根被放大

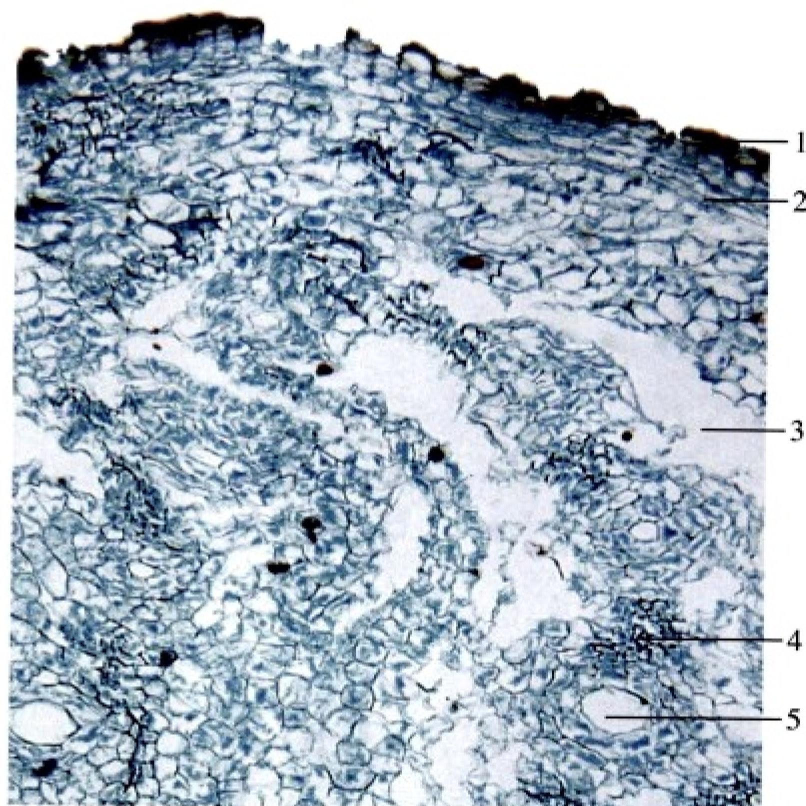
[Fig8 Velamen magnified]

1. 根被最内层细胞（Inner layer cells of velamen） 2. 纤维（Fibres）

当 归

Danggui

RADIX ANGELICAE SINENSIS



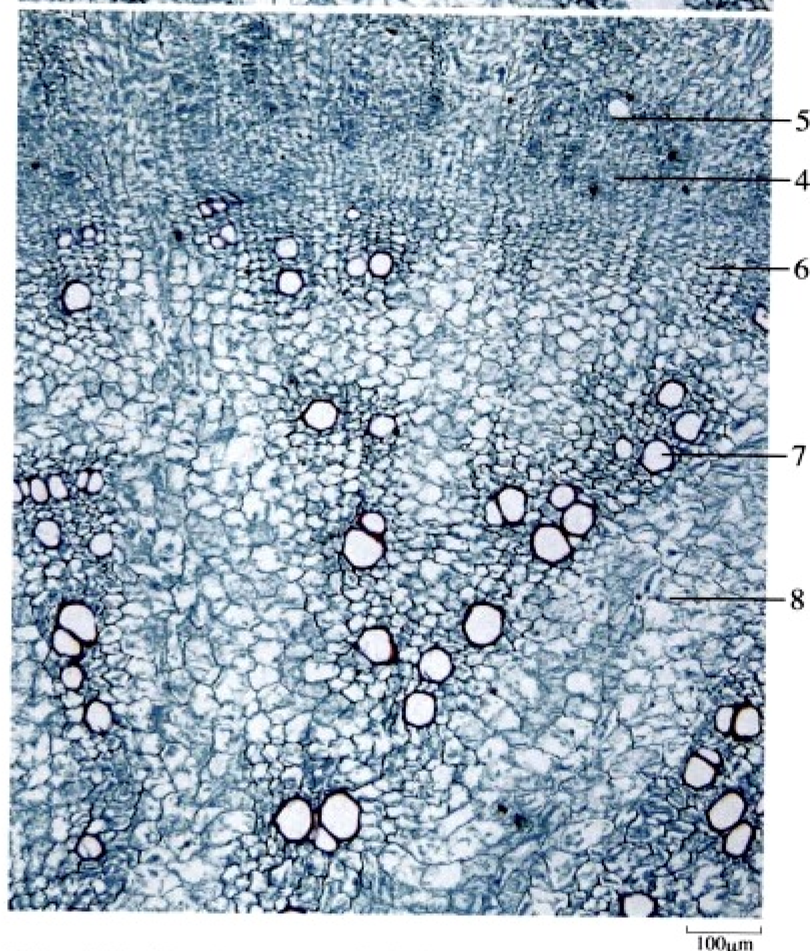


图1 当归（*Angelica sinensis* 根）横切面

[Fig1 Transverse section of root from *Angelica sinensis*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 裂隙（Clefts）
4. 韧皮部筛管群（Sieve tube groups of phloem） 5. 油室（Oil cavities）
6. 形成层（Cambium） 7. 木质部导管（Vessels） 8. 木射线（Xylem rays）

本品为伞形科植物当归*Angelica sinensis*（Oliv.）Diels 的干燥根。

[显微特征] **本品横切面**：木栓层为数列细胞。栓内层窄，有少数油室。韧皮部宽广，多裂隙，油室及油管类圆形，直径25～160μm，外侧较大，向内渐小，周围分泌细胞6～9个。形成层成环。木质部射线宽3～5列细胞；导管单个散在或2～3个相聚，呈放射状排列。薄壁细胞含淀粉粒。（图1、2）

Transverse section: Cork cells in several layers. Phelloderm narrow, scattered with a few oil cavities. Phloem broad, more cleft, oil cavities and oil tubes subrounded, 25 ~ 160 μm in diameter, relatively large on the outer side, gradually becoming small inwards, surrounded by 6 ~ 9 secretory cells. Cambium in a ring. Xylem rays wide; vessels singly scattered, or 2 ~ 3 grouped, arranged radially. Parenchymatous cells containing starch granules.（Fig 1,2）

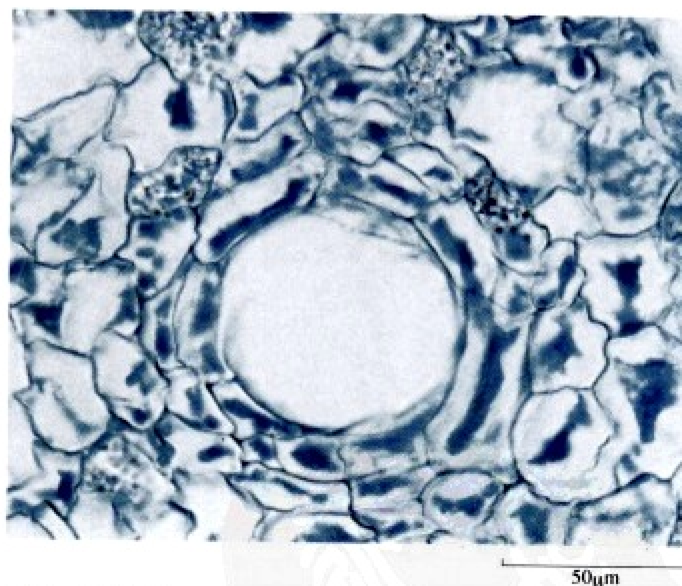


图2 示油室

[Fig2 Showing oil cavity]

本品粉末：淡黄棕色。韧皮薄壁细胞纺锤形，壁略厚，表面有极微细的斜向交错纹理，有时可见菲薄的横隔。梯纹导管及网纹导管多见，直径约至80μm。有时可见油室碎片。（图3）

Powder: Yellowish-brown. Parenchymatous cells in phloem fusiform, walls slightly thickened, with very fine oblique crisscross striations, sometimes thin transverse septa visible. Scalariform and reticulate vessels frequent, up to 80 μm in diameter. Sometimes fragments of oil cavities visible.（Fig 3）



图3 当归（*Angelica sinensis* 根）粉末

[Fig3 Powder of root from *Angelica sinensis*]

1. 韧皮薄壁细胞（Phloem parenchymatous cells） 2. 导管（Vessels） 3. 油室碎片（Fragments of oil cavities）

肉 豆 蔻

Roudoukou

SEMEN MYRISTICAE

本品为肉豆蔻科植物肉豆蔻*Myristica fragrans* Houtt. 的干燥种仁。

[显微特征] 本品横切面：外层外胚乳组织，由10余列扁平皱缩细胞组成，内含棕色物，偶见小方晶，错入组织有小维管束，暗棕色的外胚乳深入于浅黄色的内胚乳中，形成大理石样花纹，内含多数油细胞。内胚乳细胞壁薄，类圆形，充满淀粉粒、脂肪油及糊粉粒，内有疏散的浅黄色细胞。淀粉粒多为单粒，直径10～20 μm，少数为2～6分粒组成的复粒，直径25～30 μm，脐点明显。(图1、2)

Transverse section: Outer layers of perisperm consisting of more than 10 rows of flattened and wrinkled cells, containing brown contents, small prisms visible occasionally, crisscross tissue with small vascular bundles, dark brown perisperm inserting to the pale yellow endosperm, forming marble-like striations, with numerous oil cells. Cells of endosperm thin-walled, subrounded, filled with starch granules, fatty oil droplets and aleurone grains, scattered with pale yellow cells. Starch granules mostly simple, 10～20 μm in diameter, occasionally compound, composed of 2～6 components, 25～30 μm in diameter, hilum distinct.(Fig 1,2)

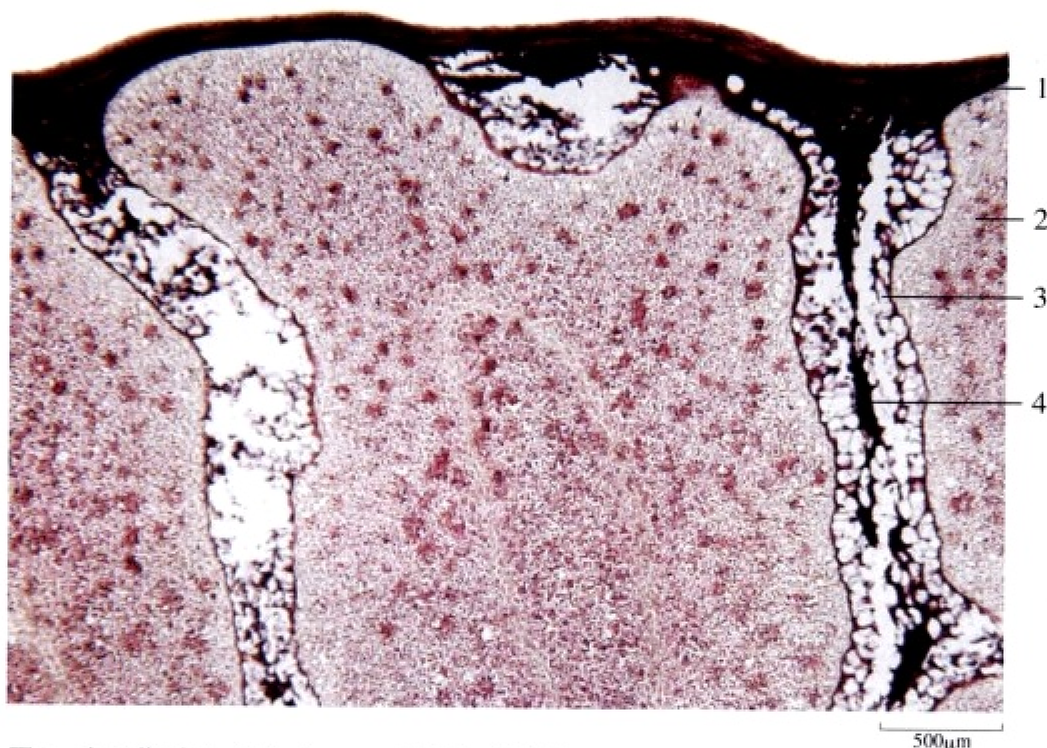


图1 肉豆蔻（*Myristica fragrans* 种仁）横切面

[Fig1 Transverse section of kernel from *Myristica fragrans*]

1. 外胚乳（Perisperm） 2. 内胚乳（Endosperm） 3. 错入组织（Crisscross tissue）
4. 维管束（Vascular bundles）

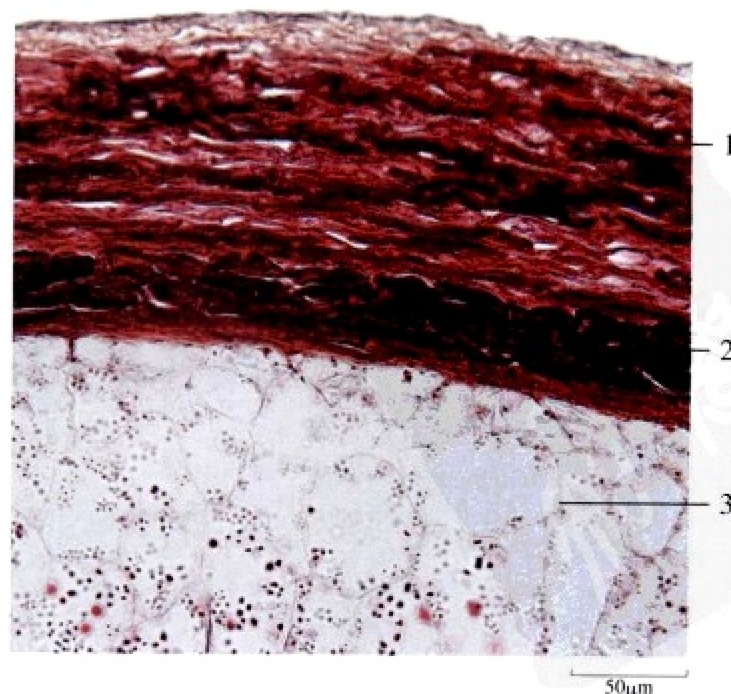


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 外胚乳外层（Outer layers of perisperm）
2. 外胚乳内层（Inner layers of perisperm）
3. 内胚乳（Endosperm）

肉　　桂

Rougui

CORTEX CINNAMOMI

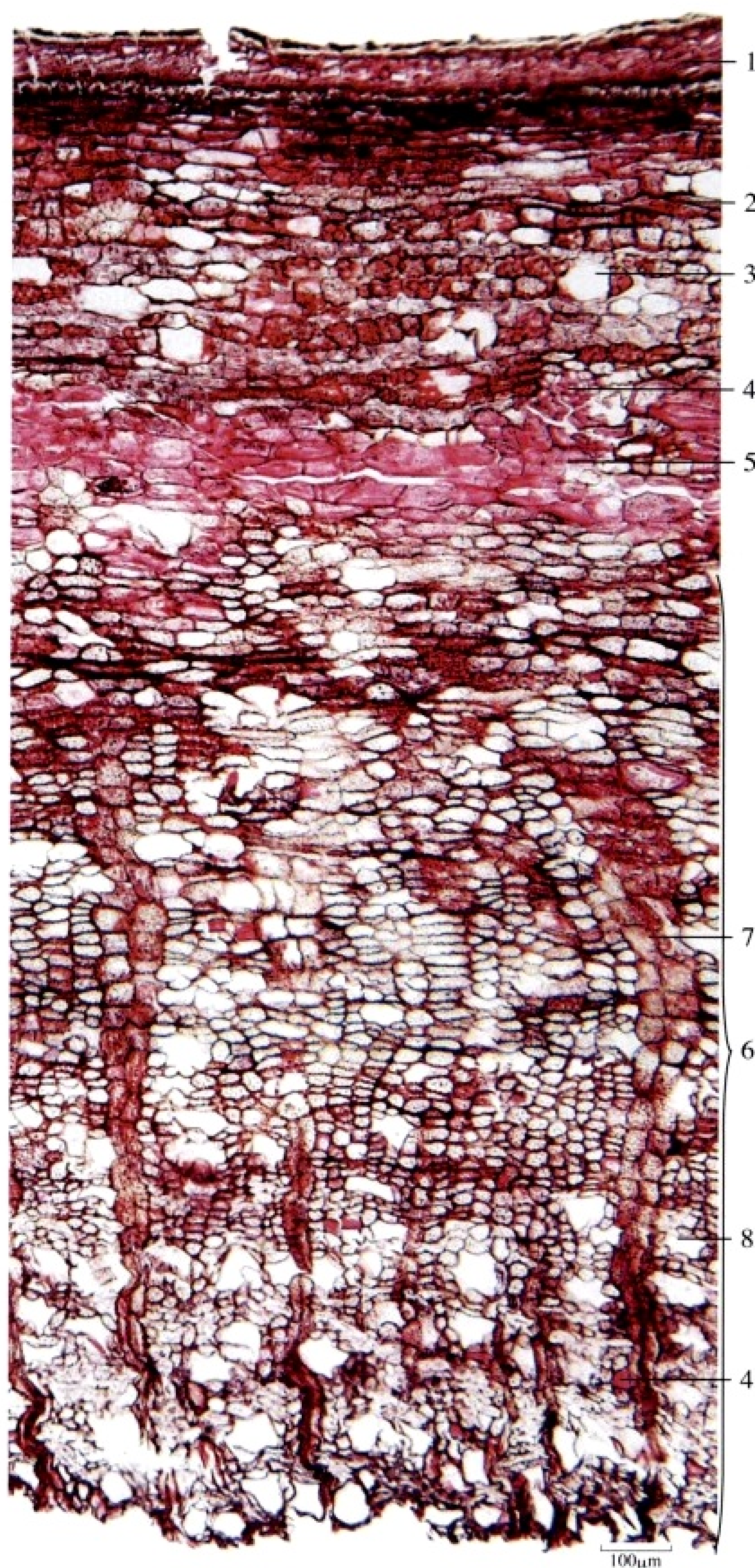


图1　肉桂（*Cinnamomum cassia* 树皮）横切面

[Fig1　Transverse section of stem bark from *Cinnamomum cassia*]

1. 木栓层（Cork）　2. 皮层（Cortex）　3. 分泌细胞（Secretory cells）　4. 纤维束（Fibre bundles）　5. 石细胞群（Groups of stone cells）　6. 韧皮部（Phloem）　7. 射线（Rays）　8. 油细胞（Oil cells）

本品为樟科植物肉桂*Cinnamomum cassia* Presl的干燥树皮。

[显微特征]　本品横切面：木栓细胞数列，最内层细胞外壁增厚，木化。皮层散有石细胞及分泌细胞。中柱鞘部位有石细胞群，断续排列成环，外侧伴有纤维束，石细胞通常外壁较薄。韧皮部射线宽1～2列细胞，含细小草酸钙针晶；纤维常2～3个成束；油细胞随处可见。薄壁细胞含淀粉粒。（图1、2）

Transverse section: Cork cells several layers, the innermost layer of cells with thickened and lignified outer walls. Cortex scattered with stone cells and secretory cells. Pericycle stone cells in groups and arranged in an interrupted ring, accompanied by fibre bundles at outer side, the outer walls of stone cells usually thinner. Phloem rays 1 ~ 2 cells wide, containing minute needle crystals of calcium oxalate; fibres usually 2 ~ 3 in bundles; oil cells scattered throughout. Parenchymatous cells containing starch granules.（Fig 1,2）

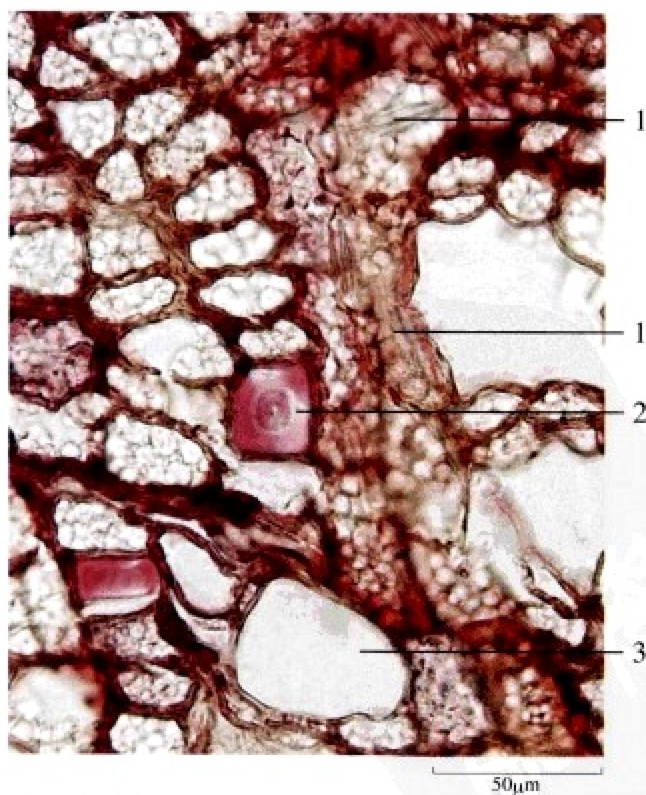


图2　韧皮部放大

[Fig2　Phloem magnified]

1. 射线细胞含草酸钙针晶（Ray cells containing needles of calcium oxalate）　2. 纤维（Fibre）　3. 油细胞（Oil cells）

本品粉末：红棕色。纤维大多单个散在，长梭形，长195～920μm，直径约至50μm，壁厚，木化，纹孔不明显。石细胞类方形或类圆形，直径32～88μm，壁厚，有的一面菲薄。油细胞类圆形或长圆形，直径45～108μm。草酸钙针晶细小，散在于射线细胞中。木栓细胞多角形，含红棕色物。(图3)

Powder: Reddish-brown. Most of fibres singly scattered, long fusiform, 195 ~ 920 μm long, up to 50 μm in diameter, walls thickened and lignified, pits indistinct. Stone cells subsquare or subrounded, 32 ~ 88 μm in diameter, walls thickened, some thin at one side. Oil cells subrounded or oblong, 45 ~ 108 μm in diameter. Needles of calcium oxalate minute, scattered in ray cells. Cork cells polygonal, containing reddish-brown contents. (Fig 3)



图3　肉桂（*Cinnamomum cassia* 树皮）粉末

[Fig3　Powder of stem bark from *Cinnamomum cassia*]

1. 纤维（Fibres）　2. 石细胞（Stone cells）　3. 油细胞（Oil cells）　4. 草酸钙针晶（Needles of calcium oxalate）　5. 木栓细胞（Cork cells）

朱 砂 根

Zhushagen

RADIX ARDISIAE CRENATAE

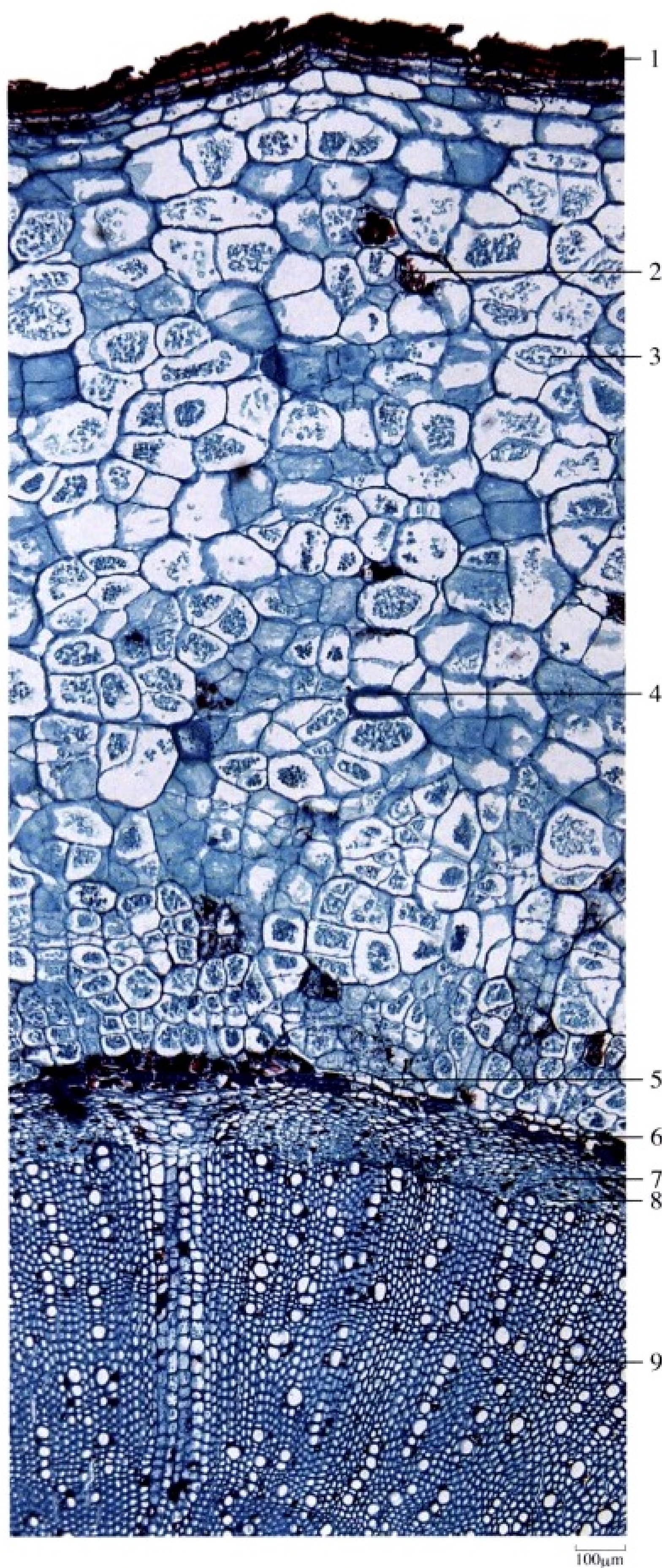


图1 朱砂根（*Ardisia crenata* 根）横切面

[Fig1 Transverse section of root from *Ardisia crenata*]

1. 木栓层（Cork） 2. 含红棕色物细胞（Cells containing reddish-brown masses） 3. 皮层（Cortex） 4. 皮层石细胞（Cortex stone cells） 5. 内皮层（Endodermis） 6. 中柱鞘石细胞（Pericyclic stone cells） 7. 韧皮部（Phloem） 8. 形成层（Cambium） 9. 木质部（Xylem）

本品为紫金牛科植物朱砂根*Ardisia crenata* Sims的干燥根。

[显微特征] 本品横切面：木栓层由3～10列类方形细胞组成，排列整齐，内侧有石细胞散在。皮层宽广，由10余列类圆形的薄壁细胞组成，有的细胞内含红棕色块状物。内皮层明显，具凯氏点，细胞内含红棕色物。中柱鞘石细胞断续排列成环。韧皮部狭窄。束内形成层明显。木质部发达，导管多径向单列，有的含有黄棕色物；木射线宽2～4列细胞。薄壁细胞含淀粉粒。（图1、2）

Transverse section: Cork consisting of 3 ~ 10 layers of subsquare cells which arranged in order, stone cells scattered in the inside. Cortex broad, consisting of 10 or more layers of subrounded parenchymatous cells, some containing reddish-brown masses. Endodermis distinct, with Casparian dots, cells containing reddish-brown contents. Pericyclic stone cells arranged in an interrupted ring. Phloem narrow. Fascicular cambium ring distinct. Xylem well developed, vessels mostly radially arranged in single rows, some containing yellowish-brown contents; rays 2 ~ 4 rows of cells wide. Parenchymatous cells containing starch granules. (Fig 1,2)

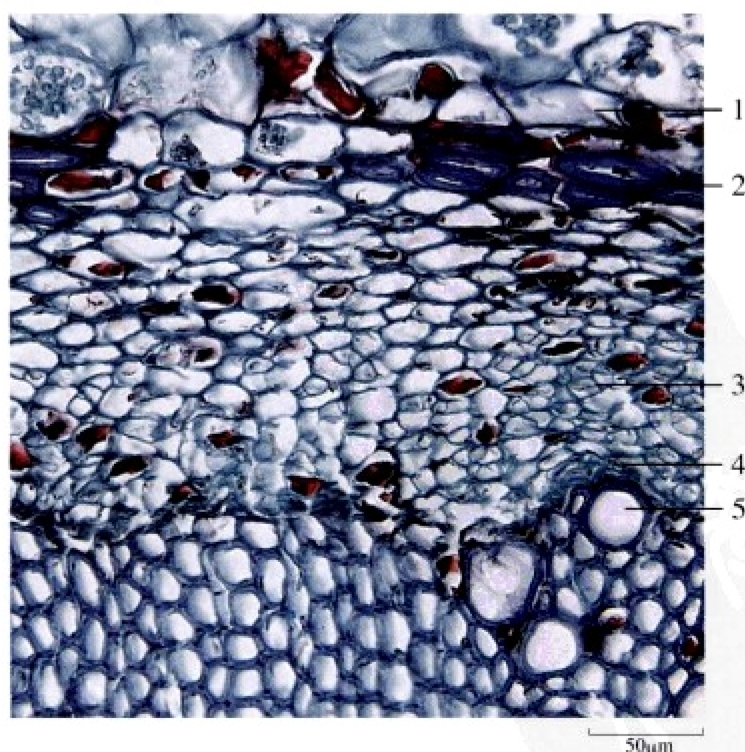


图2 中柱部分放大

[Fig2 Stele partially magnified]

1. 内皮层（Endodermis） 2. 中柱鞘石细胞（Pericyclic stone cells） 3. 韧皮部（Phloem） 4. 形成层（Cambium） 5. 木质部（Xylem）

本品粉末：黄棕色。木栓细胞类方形，壁略厚，排列整齐。具缘纹孔导管较多见，直径为24～95μm。木纤维细长，直径约11μm。石细胞呈类方形或不规则长方形，长径为112～160μm，短径为44～110μm，孔沟明显，有的可见层纹，胞腔较大。可见大量红棕色块状物。淀粉粒众多，呈类圆形、盔帽形或不规则形，直径为4～36μm，脐点明显，呈点状、裂缝状或人字形，层纹不明显；复粒由2～4个分粒组成。（图3）

Powder: Yellowish-brown. Cork cells subsquare, walls slightly thick, arranged in order. Bordered pitted vessels usually visible, 24 ~ 95 μm in diameter. Xylem fibres slender, about 11 μm in diameter. Stone cells subsquare or irregular rectangular, 112 ~ 160 μm in long diameter, 44 ~ 110 μm in short diameter, pit canals distinct, some with striations, lumina relatively large. A great deal of brown masses visible. Starch granules abundant, subrounded, helmet-shaped or irregular, 4 ~ 36 μm in diameter, hilum distinct, dotted, clefted or V-shaped, striations indistinct; compound granules consisting of 2 ~ 4 component granules.（Fig 3）

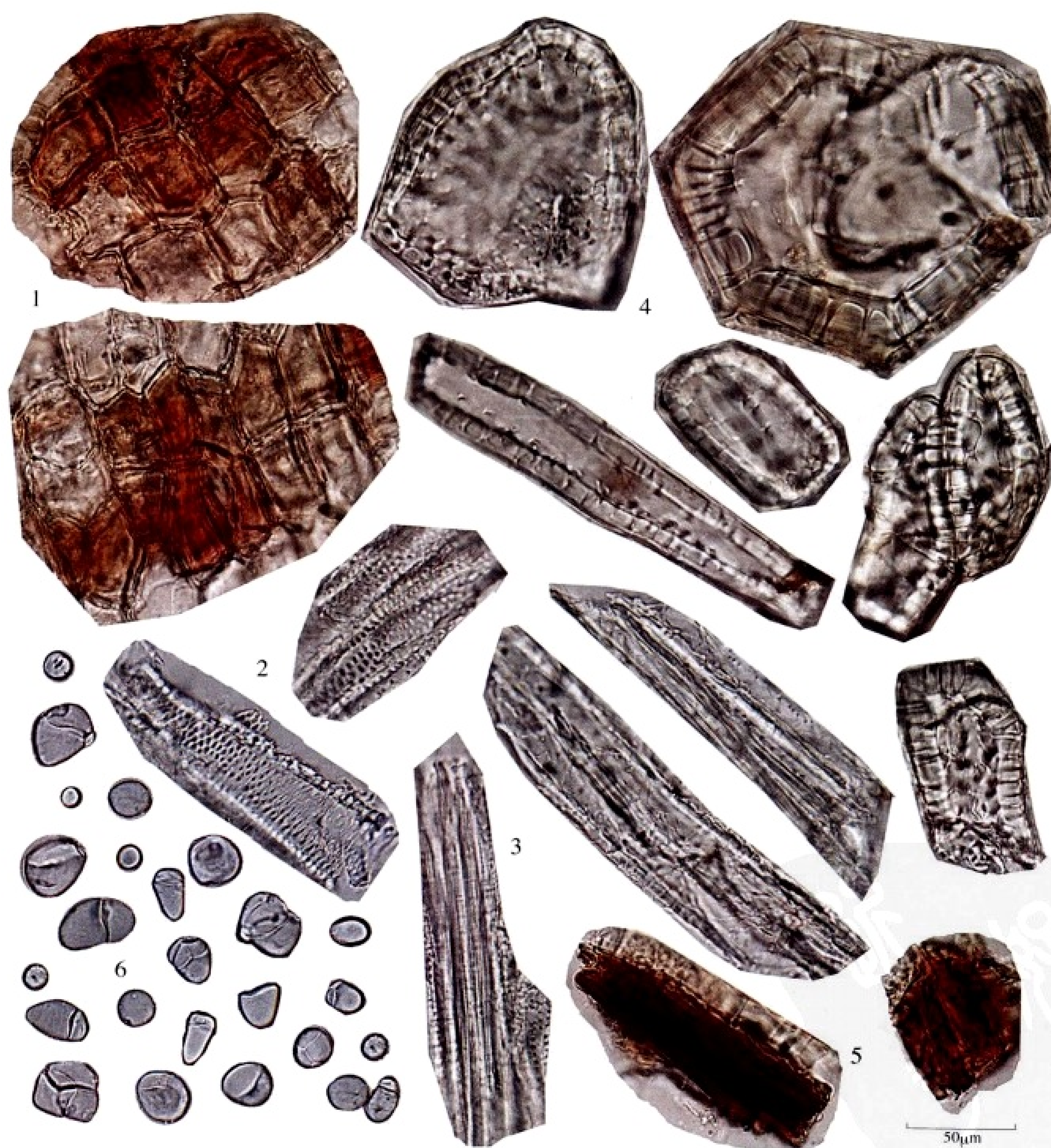


图3 朱砂根（*Ardisia crenata* 根）粉末

[Fig3 Powder of root from *Ardisia crenata*]

1. 木栓细胞（Cork cells） 2. 导管（Vessels） 3. 木纤维（Fibres） 4. 石细胞（Stone cells） 5. 红棕色块状物（Reddish-brown masses） 6. 淀粉粒（Starch granules）

竹 节 参

Zhujieshen

RHIZOMA PANACIS JAPONICI

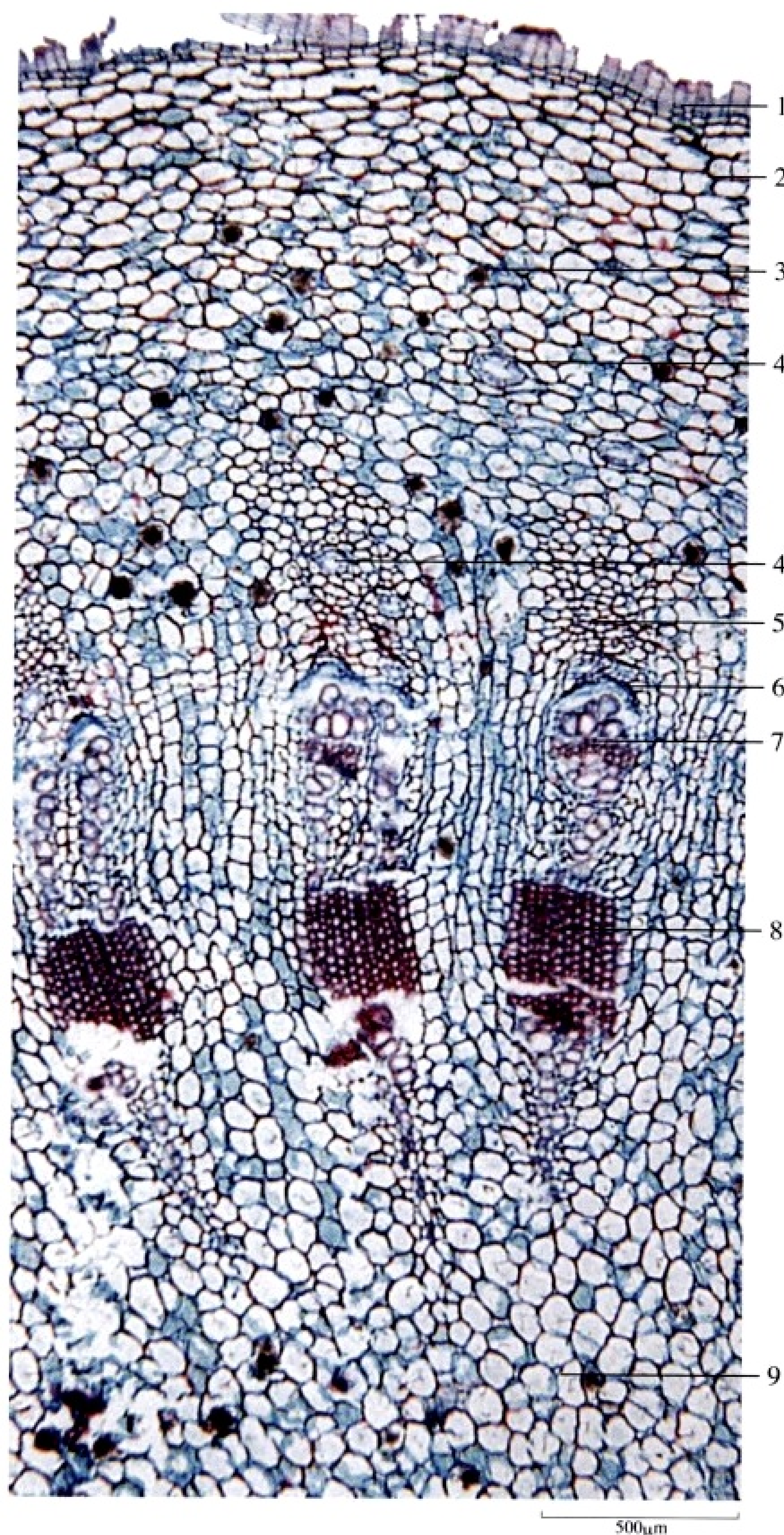


图1 竹节参（*Panax japonicus* 根茎）横切面

[Fig1 Transverse section of rhizome from *Panax japonicus*]

1. 木栓层（Cork layer） 2. 皮层（Cortex） 3. 草酸钙簇晶（Clusters of calcium oxalate） 4. 分泌道（Secretory canal） 5. 韧皮部（Phloem） 6. 形成层（Cambium） 7. 木质部（Xylem） 8. 木纤维（Woody fibres） 9. 髓（Pith）

本品为五加科植物竹节参*Panax japonicus* C. A. Mey. 的干燥根茎。

[显微特征] 本品横切面：木栓层为2～10列细胞。皮层稍宽，有少数分泌道。维管束外韧型，环状排列。形成层成环。韧皮部偶见分泌道。木质部束略作2～4列放射状排列，也有呈单行排列；木纤维常1～4束，有的纤维束旁有较大的木化厚壁细胞。中央有髓。薄壁细胞中含众多草酸钙簇晶，直径17～70μm，并含淀粉粒。（图1、2）

Transverse section: Cork consisting of 2 ~ 10 layers of cells. Cortex slightly broad, scattering a few secretory canals. Vascular bundles collateral, arranged in a ring. Cambium in a ring. In phloem secretory canals found occasionally. Xylem bundles somewhat in 2 ~ 4 strands arranged radially or in single row, woody fibres usually in 1 ~ 4 bundles, some accompanied by large, lignified sclerenchymatous cells. Pith visible. Parenchymatous cells containing clusters of calcium oxalate,17 ~ 70 μm in diameter, and starch granules. (Fig 1,2)

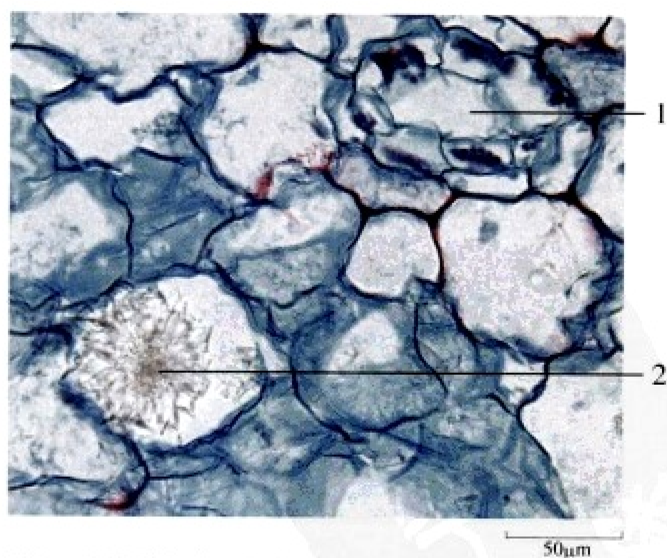


图2 分泌道与草酸钙簇晶

[Fig2 Showing secretory canal and clusters of calcium oxalate]

1. 分泌道（Secretory canal）
2. 草酸钙簇晶（Clusters of calcium oxalate）

本品粉末：黄白色至黄棕色。木纤维成束，直径约25μm，壁稍厚，纹孔斜裂缝状，有的交叉呈人字形。草酸钙簇晶多见，直径15～70μm。梯纹导管、网纹导管或具缘纹孔导管直径20～70μm。树脂道碎片偶见，内含黄色块状物。木栓组织碎片细胞呈多角形、长方形或不规则形，壁厚。淀粉粒众多，多单粒，呈类圆形，直径约至10μm，或已糊化。（图3）

Powder: Yellowish-white to yellowish-brown. Woody fibres in bundles, about 25 μm in diameter, walls slightly thickened, pits oblique cleft-like, some crisscrossed to be V-shaped. Clusters of calcium oxalate numerous, 15 ~ 70 μm in diameter. Vessels scalariform, reticulated or bordered pitted, 20 ~ 70 μm in diameter. Resin canal pieces occasionally found, containing yellow masses. Cork cells polygonal, rectangular or irregular, walls thickened. Starch granules abundant, mainly simple, subrounded, about 10μm in diameter, or gelatinized.（Fig 3）



图3 竹节参（*Panax japonicus* 根茎）粉末

[Fig3 Powder of rhizome from *Panax japonicus*]

1. 纤维（Fibres） 2. 草酸钙簇晶（Clusters of calcium oxalate） 3. 导管（Vessels） 4. 树脂道碎片（Pieces of resin canal） 5. 木栓细胞（Cork cells） 6. 淀粉粒（Starch granules）

延胡索（元胡）

Yanhusuo

RHIZOMA CORYDALIS

本品为罂粟科植物延胡索*Corydalis yanhusuo* W. T. Wang 的干燥块茎。

[显微特征] 本品粉末：绿黄色。糊化淀粉粒团块淡黄色或近无色。下皮厚壁细胞绿黄色，细胞多角形、类方形或长条形，壁稍弯曲，木化，有的成连珠状增厚，纹孔细密。螺纹导管直径16～32μm。（图1）

Powder: Greenish-yellow. Gelatinized starch masses pale yellow or nearly colourless. Hypodermis sclerenchymatous cells greenish-yellow, polygonal, subsquare or elongated, walls slightly sinuous, lignified, some beaded, finely pitted. Spiral vessels 16～32 μm in diameter.（Fig 1）



图1 延胡索（*Corydalis yanhusuo* 块茎）粉末

[Fig1 Powder of tuber rhizome from *Corydalis yanhusuo*]

1. 含糊化淀粉粒细胞（Cells containing gelatinized starch masses） 2. 下皮厚壁细胞（Hypodermal sclerenchymatous cells）
3. 导管（Vessels）

华 山 参

Huashanshen

RADIX PHYSOCHLAINAE

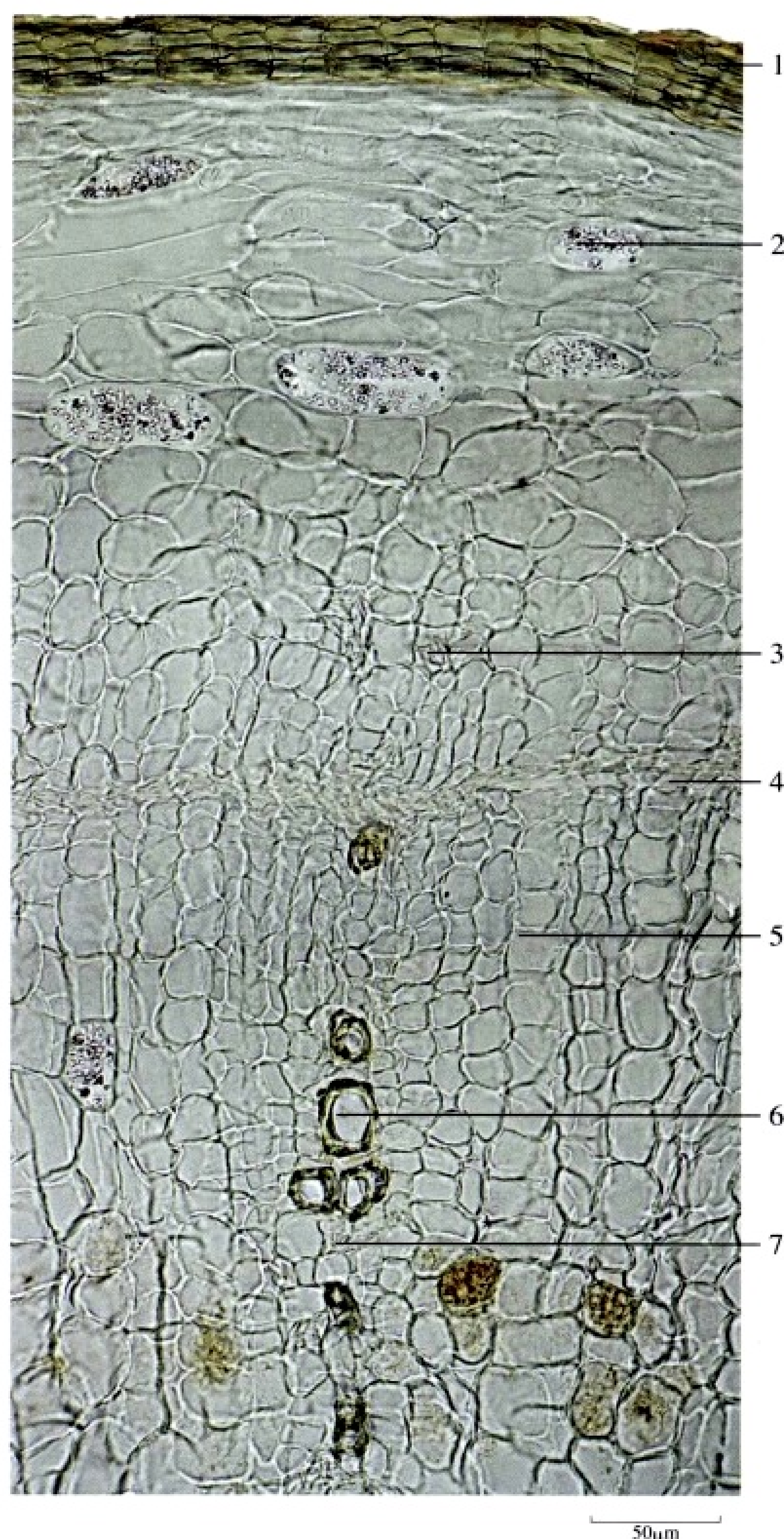


图1 华山参（*Physochlaina infundibularis* 根）横切面

[Fig1 Transverse section of root from *Physochlaina infundibularis*]

1. 木栓层（Cork layer） 2. 草酸钙砂晶（Sand crystals of calcium oxalate）
3. 韧皮部（Phloem） 4. 形成层（Cambium） 5. 木射线（Xylem ray）
6. 木质部（Xylem） 7. 木间韧皮部（Interxylary phloem）

本品为茄科植物漏斗泡囊草*Physochlaina infundibularis* Kuang 的干燥根。

[显微特征] 本品横切面：木栓层为数列至十余列木栓细胞，最外层细胞黄棕色。形成层环明显。木质部占根的大部分，导管数个相聚，有的导管旁有细小筛管群，为木间韧皮部。木薄壁组织及射线有含砂晶细胞。近中心的导管或导管群四周有时围有数层至十余层棕色扁平形木栓化细胞，内含黄棕色分泌物。薄壁细胞充满淀粉粒，有的含草酸钙砂晶。（图1、2）

Transverse section: Cork of several to 10 or more layers of cells, the outermost one yellowish-brown. Cambium ring distinct. Xylem occupying the majority of a root, vessels several in groups, some of them accompanied by fine sieve tubes, known as interxylary phloem. Xylary parenchyma and rays showing cells containing sand crystals. Sometimes vessels or groups of vessels near the centre surrounded by several up to more than 10 layers of brown, flattened and suberized cells containing yellowish-brown contents. Parenchymatous cells filled with starch granules, some containing sand crystals of calcium oxalate.（Fig 1,2）

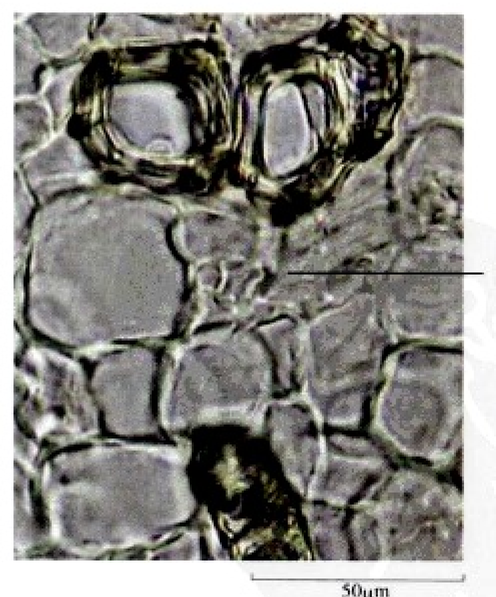


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 木间韧皮部（Interxylary phloem）

本品粉末：灰白色。淀粉粒甚多，单粒类圆形，直径3～15μm，脐点点状、裂缝状或叉状；复粒由2～4分粒组成。草酸钙砂晶多存在于薄壁细胞中。网纹导管直径17～85μm。(图3)

Powder: Greyish-white. Starch granules fairly abundant, simple granules subspheroidal, 3 ~ 15 μm in diameter, hilum pointed, cleft or Y-shaped; compound granules of 2 ~ 4 components. Sand crystals mostly embedded in parenchymatous cells. Reticulated vessels 17 ~ 85 μm in diameter. (Fig 3)

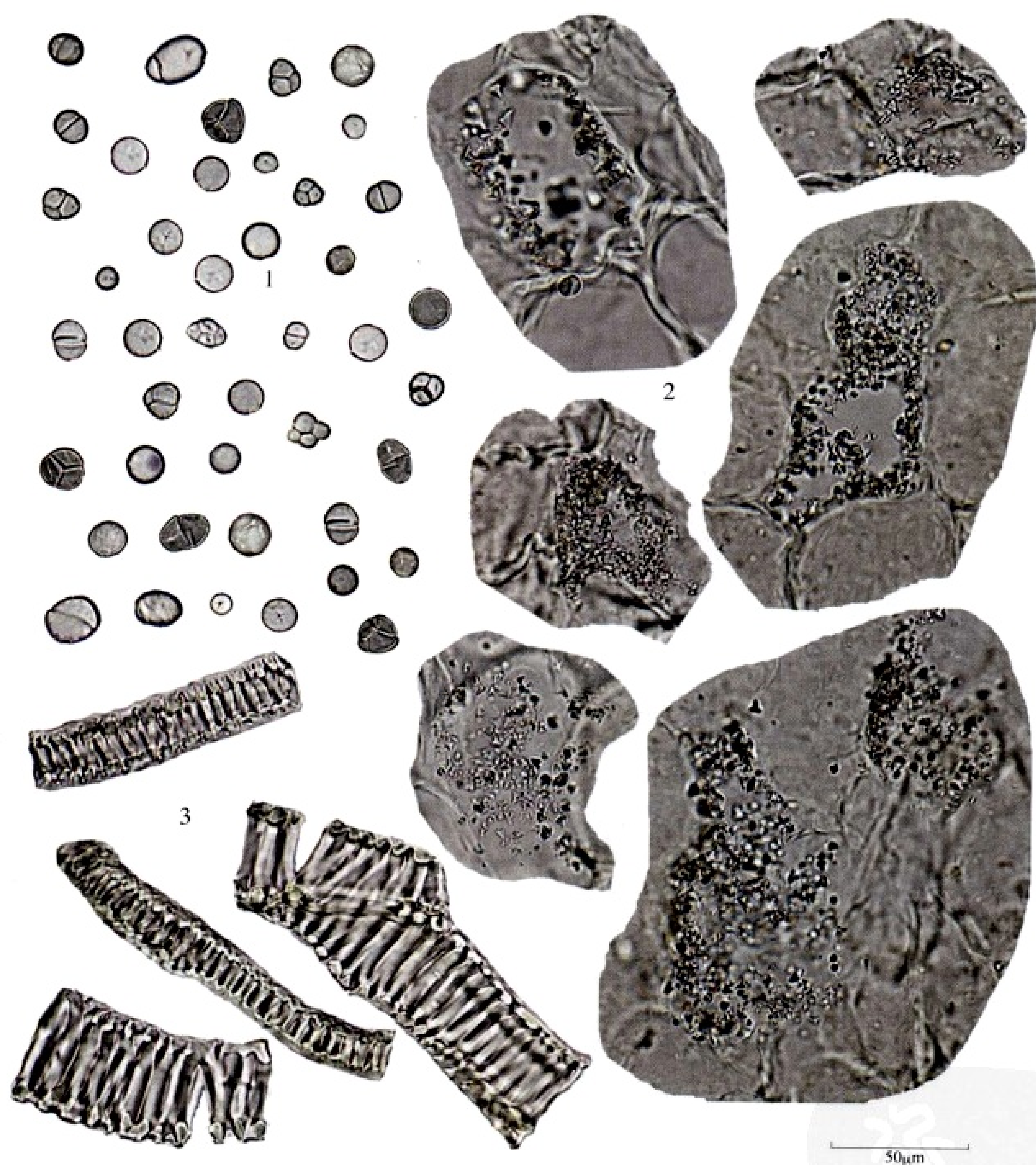


图3 华山参（*Physochlaina infundibularis* 根）粉末

[Fig3 Powder of root from *Physochlaina infundibularis*]

1. 淀粉粒（Starch granules） 2. 薄壁细胞含草酸钙砂晶（Parenchymatous cell containing sand crystals of calcium oxalate）
3. 导管（Vessels）

伊 贝 母

Yibeimu

BULBUS FRITILLARIAE PALLIDIFLORAE

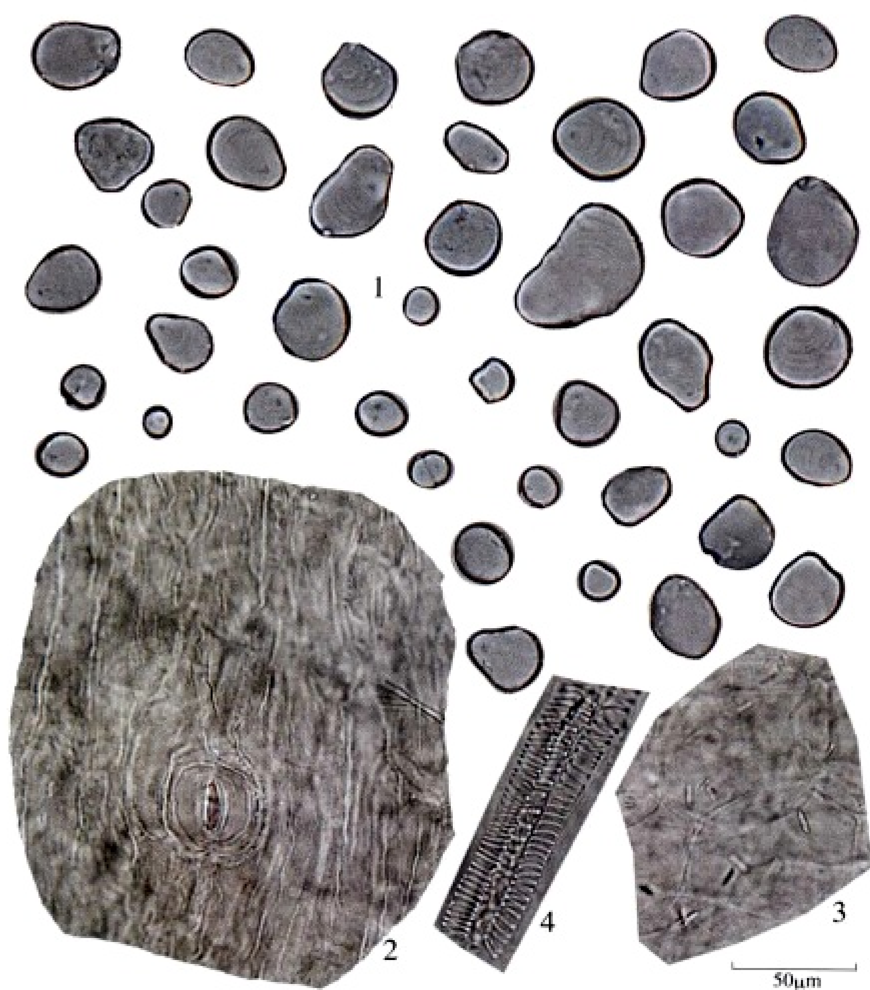


图1 伊贝母（*Fritillaria walujewii* 鳞茎）粉末
[Fig1 Powder of bulb from *Fritillaria walujewii*]
1. 淀粉粒（Starch granules） 2. 表皮细胞（Epidermal cells）
3. 草酸钙方晶（Prisms of calcium oxalate） 4. 导管（Vessels）

本品为百合科植物新疆贝母*Fritillaria walujewii* Regel或伊犁贝母*Fritillaria pallidiflora* Schrenk 的干燥鳞茎。

[显微特征] 本品粉末：类白色，以淀粉粒为主体。

新疆贝母 淀粉粒单粒广卵形、卵形或贝壳形，直径5～54μm，脐点点状、人字状或短缝状，层纹明显；复粒少，由2分粒组成。表皮细胞类长方形，垂周壁微波状弯曲，细胞内含细小草酸钙方晶；气孔不定式，副卫细胞4～6。螺纹导管及环纹导管直径9～56μm。（图1）

Powder: Whitish, mainly consisting of starch granules.

Bulbs of *Fritillaria walujewii:* Starch granules simple, broadly ovoid, ovoid or conchoidal, 5～54 μm in diameter, hilum pointed, V-shaped or shortly slit-shaped, striations distinct; compound granules less, of 2 components. Epidermal cells subrectangular, with sinuous anticlinal walls, containing small prisms of calcium oxalate. Stomata anomocytic, with 4～6 subsidiary cells, spiral and annular vessels 9～56 μm in diameter.（Fig 1）

伊犁贝母 淀粉粒单粒广卵形、三角状卵形、贝壳形或不规则圆形，直径约至60μm，脐点点状、人字状或十字状。导管直径约50μm。（图2）

Bulbs of *Fritillaria pallidiflora:* Starch granules simple, broadly ovoid, triangular ovoid, conchoidal or irregularly rounded, up to 60 μm in diameter, hilum pointed, V-shaped or crossed. Vessels about 50 μm in diameter.（Fig 2）



图2 伊贝母（*Fritillaria pallidiflora* 鳞茎）粉末
[Fig2 Powder of bulb from *Fritillaria pallidiflora*]
1. 淀粉粒（Starch granules） 2. 导管（Vessels）

合 欢 皮

Hehuanpi

CORTEX ALBIZIAE

本品为豆科植物合欢*Albizia julibrissin* Durazz. 的干燥树皮。

[显微特征] 本品粉末：灰黄色。石细胞类长圆形、类圆形、长方形、长条形或不规则形，直径16～58μm，壁较厚，孔沟明显，有的分枝。纤维细长，直径7～22μm，常成束，周围细胞含草酸钙方晶，形成晶纤维，含晶细胞壁不均匀增厚，木化或微木化。草酸钙方晶直径5～26μm。韧皮薄壁细胞壁稍厚，径向面观纹孔圆形，有的集成纹孔团；切向面观细胞壁略成连珠状增厚。（图1）

Powder: Greyish-yellow. Stone cells suboblong, subrounded, rectangular, slat-shaped or irregular, 16～58 μm in diameter, walls relatively thickened, pit canals distinct, some branched. Fibres slender, 7～22 μm in diameter, usually in bundles, surrounded by cells containing prisms of calcium oxalate, forming crystal fibres, the walls of cells containing crystals unevenly thickened, lignified or slightly lignified. Prisms of calcium oxalate 5～26 μm in diameter. Parenchymatous cells of phloem relatively small, walls slightly thickened with rounded pits in radial sectional view, some aggregated to pit groups; the walls somewhat beaded in tangential sectional view.（Fig 1）



图1　合欢皮（*Albizia julibrissin* 树皮）粉末

[Fig1　Powder of bark from *Albizia julibrissin*]

1. 石细胞（Stone cells）　2. 晶纤维（Crystal fibres）　3. 方晶（Prisms）

4. 韧皮薄壁细胞[Parenchymatous cells of phloem（a. 径向面观Radial sectional view　b. 切向面观Tangential sectional view）]

合 欢 花

Hehuanhua

FLOS ALBIZIAE

本品为豆科植物合欢*Albizia julibrissin* Durazz. 的干燥花序。

[显微特征]　本品粉末：灰黄色。非腺毛单细胞，长81～447 μm。草酸钙方晶较多，存在于薄壁细胞中，直径3～31μm。复合花粉粒呈扁球形，为16合体，直径81～146 μm，外围8个围在四周；单个分体呈类方形或长球形。（图1）

Powder: Greyish-yellow. Non-glandular hairs unicellular, 81～447 μm long. Prisms of calcium oxalate frequently occurring in the parenchymatous cells, 3～31 μm in diameter. Compound pollen grains oblate, 16-polysomic, 81～146 μm in diameter, the central 8 monosomics arranged in cruciform and surrounded by the other 8 monosomics; individual monosomic subsquare or long-spherical.（Fig 1）



图1　合欢花（*Albizia julibrissin* 花序）粉末

[Fig1　Powder of inflorescence from *Albizia julibrissin*]

1. 单细胞非腺毛（Non-glandular hairs）　2. 草酸钙方晶（Prisms of calcium oxalate）

3. 复合花粉粒（Compound pollen grains）

决 明 子

Juemingzi

SEMEN CASSIAE

本品为豆科植物决明*Cassia obtusifolia* L. 或小决明*Cassia tora* L. 的干燥成熟种子。

[显微特征] **本品粉末**：黄棕色。种皮栅状细胞无色或淡黄色，侧面观细胞1列，呈长方形，排列稍不平整，长42～53μm，壁较厚，光辉带2条；表面观呈类多角形，壁稍皱缩。种皮支持细胞表面观呈类圆形，直径10～35（55）μm，可见两个同心圆圈；侧面观呈哑铃状或葫芦状。角质层碎片厚11～19μm。草酸钙簇晶众多，多存在于薄壁细胞中，直径8～21μm。(图1)

Powder: Yellowish-brown. Palisade cells of testa colourless or pale yellow, one row in section view, rectangular, arranged slightly disorderly, 42 ~ 53 μm long, walls relatively thickened, with two streaks of light bands; subpolygonal in surface view, walls somewhat shrunken. Supporting cells of testa subrounded in surface view, 10～35 (55) μm in diameter, two concentric circles visible, dumbbell shaped or cucurbit shaped in lateral view. The fragments of cuticle 11 ~ 19 μm thick. Clusters of calcium oxalate numerous, mostly existed in parenchymatous cells, 8～21 μm in diameter. (Fig 1)

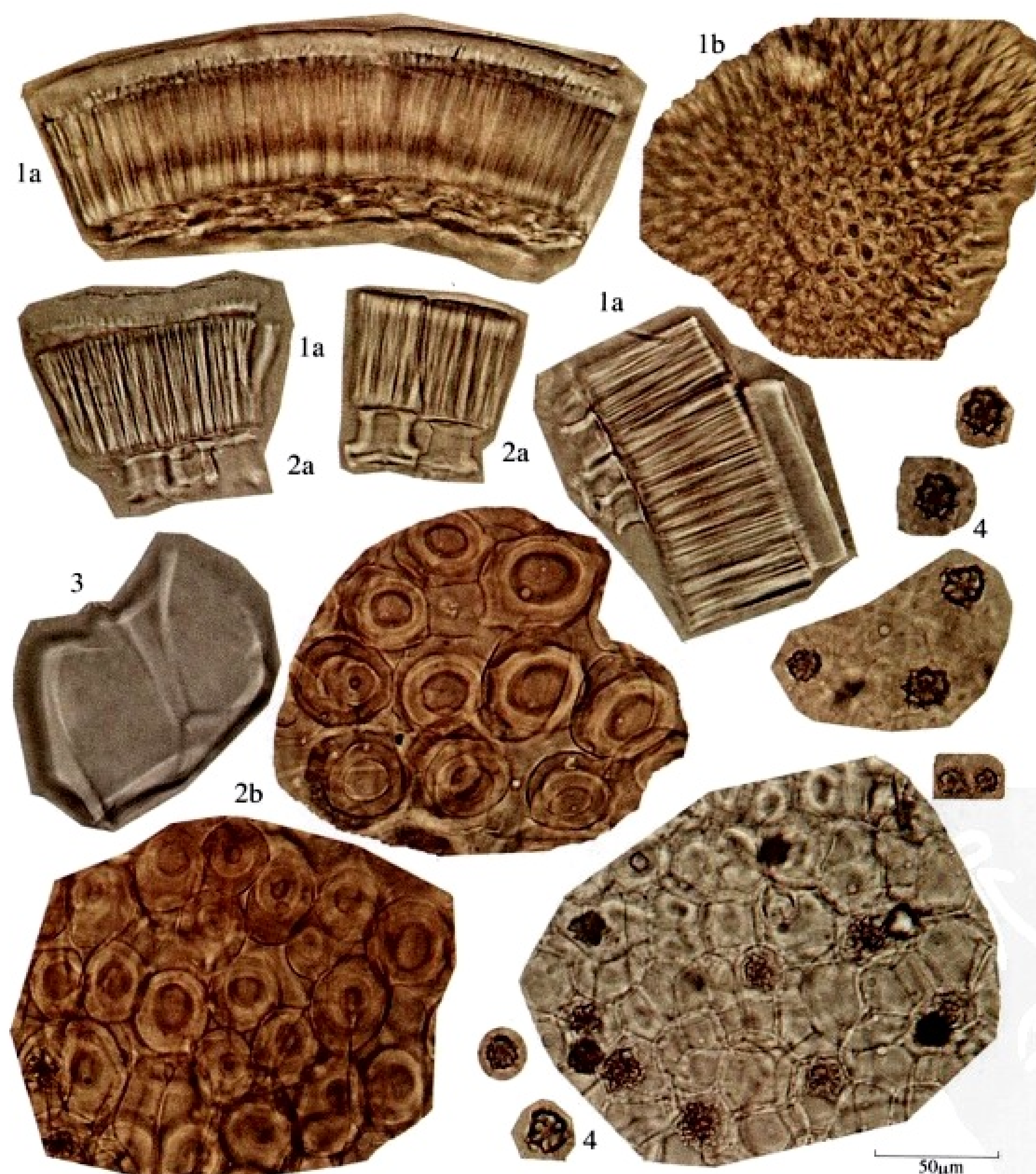


图1 决明子（*Cassia obtusifolia* 种子）粉末

[Fig1 Powder of seed from *Cassia obtusifolia*]

1. 栅状细胞[Palisade cells（a. 侧面观Lateral view b. 表面观Surface view）] 2. 支持细胞[Supporting cells（a. 侧面观Lateral view b. 表面观Surface view）] 3. 角质层碎片（Fragments of cuticle） 4. 草酸钙簇晶（Clusters of calcium oxalate）

关 黄 柏
Guanhuangbo
CORTEX PHELLODENDRI AMURENSIS

本品为芸香科植物黄檗*Phellodendron amurense* Rupr. 的干燥树皮。

[显微特征] 本品粉末：绿黄色或黄色。纤维鲜黄色，直径16～38μm，常成束，周围细胞含草酸钙方晶，形成晶纤维；含晶细胞壁木化增厚。石细胞鲜黄色，类圆形或纺锤形，直径35～80μm，有的呈分枝状，壁厚，层纹明显。草酸钙方晶直径约至24μm。（图1）

Powder: Greenish-yellow or yellow. Fibres bright yellow, 16 ~ 38 μm in diameter, often in bundles, surrounded by cells containing prisms of calcium oxalate, forming crystal fibres, the walls of crystal cells lignified and thickened. Stone cells bright yellow, subrounded or fusiform, 35 ~ 80 μm in diameter, some branched, walls thickened, with distinct striations. Prisms of calcium oxalate 24 μm in diameter.（Fig 1）



图1 关黄柏（*Phellodendron amurense* 树皮）粉末
[Fig1 Powder of bark from *Phellodendron amurense*]
1. 晶纤维（Crystal fibres） 2. 石细胞（Stone cells） 3. 草酸钙方晶（Prisms of calcium oxalate）

灯　心　草

Dengxincao

MEDULLA JUNCI

本品为灯心草科植物灯心草*Juncus effusus* L. 的干燥茎髓。

［显微特征］本品粉末：类白色。全部为星状薄壁细胞，彼此以星芒相接，形成大的三角形或四边形气腔，星芒4～8，长5～51μm，宽5～12μm，壁稍厚，有的可见细小纹孔，星芒相接的壁菲薄，有的可见1～2个念珠状增厚。（图1）

Powder: Whitish. Parenchymatous cells stellate, connecting each other with the branches to form air cavities in triangular or quadrilateral shape; each cell with 4～8 branches, 5～51μm long, 5～12μm wide, walls slightly thickened, fine pits occasionally observed, connected walls thin, sometimes beaded.（Fig 1）



图1　灯心草（*Juncus effusus* 茎髓）粉末

[Fig1　Powder of stem pith from *Juncus effuses*]

灯盏细辛（灯盏花）

Dengzhanxixin

HERBA ERIGERONTIS

本品为菊科植物短葶飞蓬*Erigeron breviscapus*（Vant.）Hand.-Mazz. 的干燥全草。

[显微特征] 本品叶的表面观：表皮细胞壁波状弯曲，有角质线纹，气孔不定式。非腺毛1～8细胞，长约180～560μm。腺毛头部1～4细胞，柄1至多细胞。（图1）

Surface view of leaf: The walls of epidermal cells sinuous, with cuticular striations, stomata anomocytic. Non-glandular hairs 1～8 celled, 180～560 μm long. Glandular hairs with 1～4 celled heads and uni- or polycellular stalks.（Fig 1）

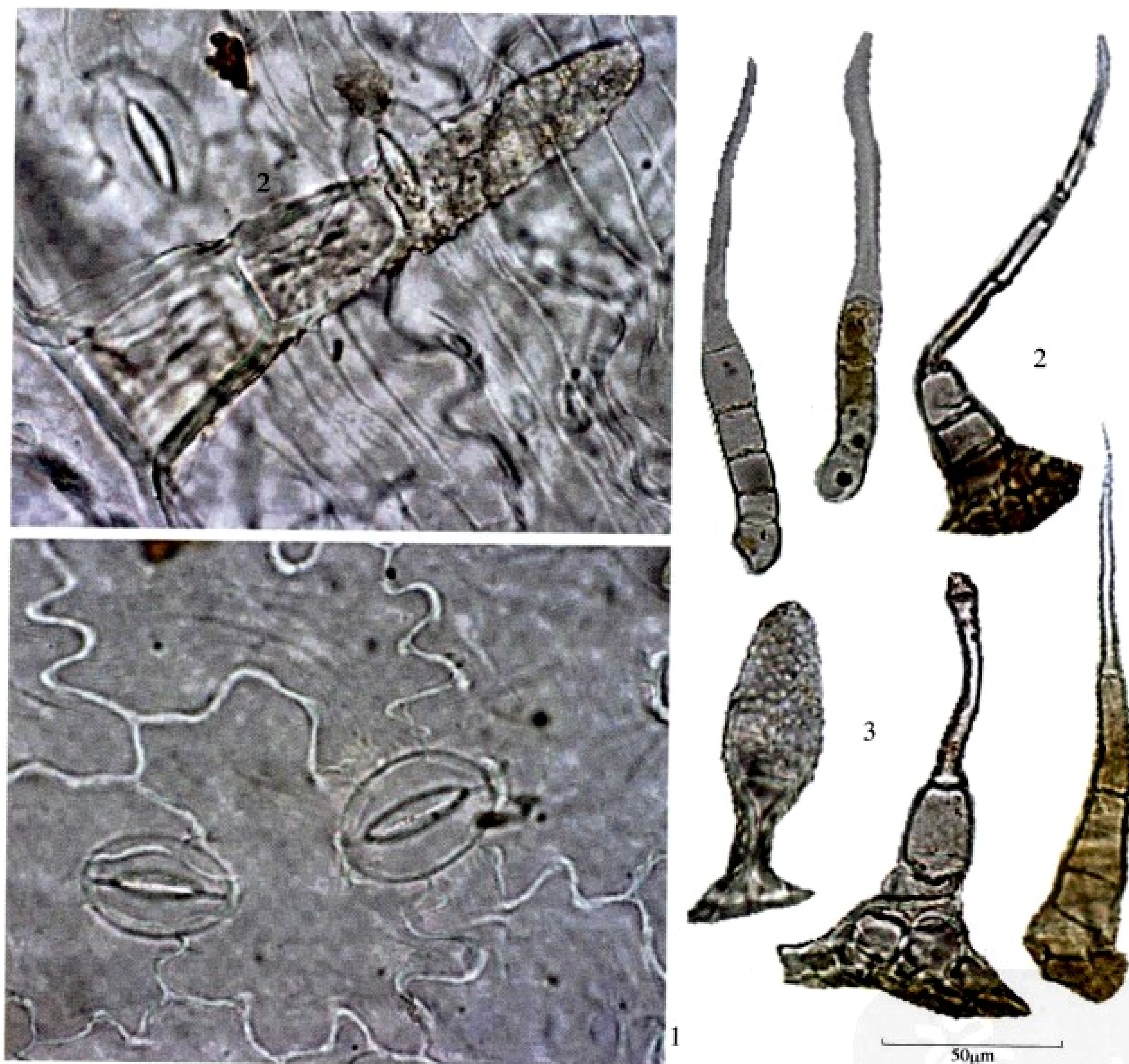


图1 灯盏细辛（*Erigeron breviscapus* 叶）表面观

[Fig1 Surface view of leaf from *Erigeron breviscapus*]

1. 表皮细胞（Epidermal cells） 2. 非腺毛（Non-glandular hairs） 3. 腺毛（Glandular hairs）

防 己
Fangji
RADIX STEPHANIAE TETRANDRAE

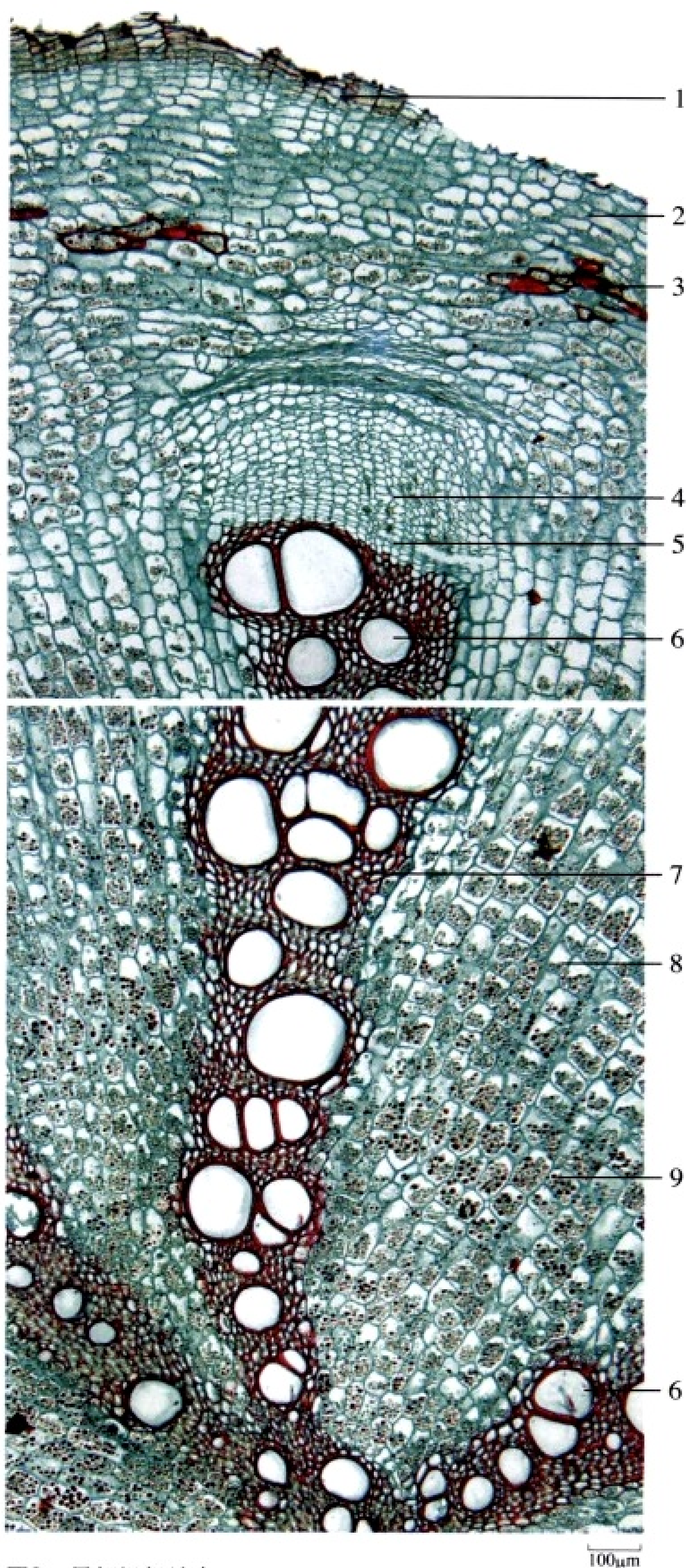


图2 局部组织放大
[Fig2 Partial tissue magnified]
1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 石细胞（Stone cells）
4. 韧皮部（Phloem） 5. 形成层（Cambium） 6. 木质部（Xylem）
7. 木纤维（Xylem fibres） 8. 木射线（Xylem rays）
9. 淀粉粒（Starch granules）

本品为防己科植物粉防己*Stephania tetrandra* S. Moore 的干燥根。

[显微特征] 本品横切面：木栓层有时残存。栓内层散有石细胞群，常切向排列。韧皮部较宽。形成层成环。木质部占大部分，射线较宽；导管稀少，呈放射状排列；导管旁有木纤维。薄壁细胞充满淀粉粒，并可见细小杆状草酸钙结晶。(图1～3)

Transverse section: Remaining cork sometimes visible. Phelloderm scattered with stone cell groups, usually arranged tangentially. Phloem relatively broad. Cambium in a ring. Xylem occupied the most part of the section, rays wide; vessels rare, radially arranged, accompanied by wood fibres. Parenchymatous cells filled with starch granules and a few minute rod-shaped crystals of calcium oxalate. (Fig 1～3)

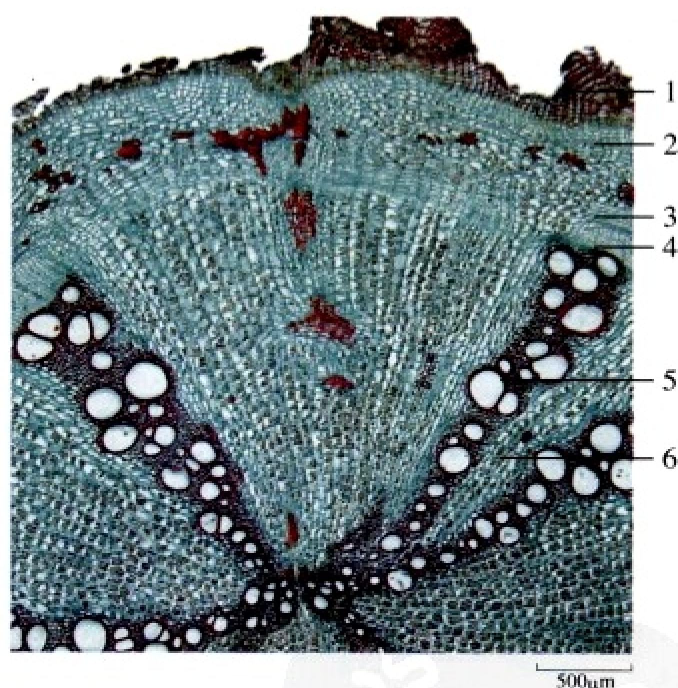


图1 防己（*Stephania tetrandra* 根）横切面
[Fig1 Transverse section of root from *Stephania tetrandra*]
1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 韧皮部（Phloem）
4. 形成层（Cambium） 5. 木质部（Xylem） 6. 木射线（Xylem rays）



图3 示栓内层石细胞
[Fig3 Showing stone cells in phelloderm]

防 风

Fangfeng

RADIX SAPOSHNIKOVIAE

本品为伞形科植物防风*Saposhnikovia divaricata*（Turcz.）Schischk. 的干燥根。

[显微特征]　本品横切面：木栓层为5～30列细胞。栓内层窄，有较大的椭圆形油管。韧皮部较宽，有多数类圆形油管，管内可见金黄色分泌物；射线多弯曲，外侧常成裂隙。形成层明显。木质部导管甚多，呈放射状排列。根头处有髓，薄壁组织中偶见石细胞。（图1、2）

Transverse section: Cork consisting of 5～30 layers of cells. Phelloderm narrow and showing larger elliptical vittae. Phloem broader, scattered with numerous subrounded vittae, gold secretion visible in vittae; rays mostly curved and becoming cleft in the outer part. Cambium distinct. Xylem vessels fairly abundant, arranged radially. Pith present in root stock, stone cells in parenchyma occasionally visible. (Fig 1, 2)

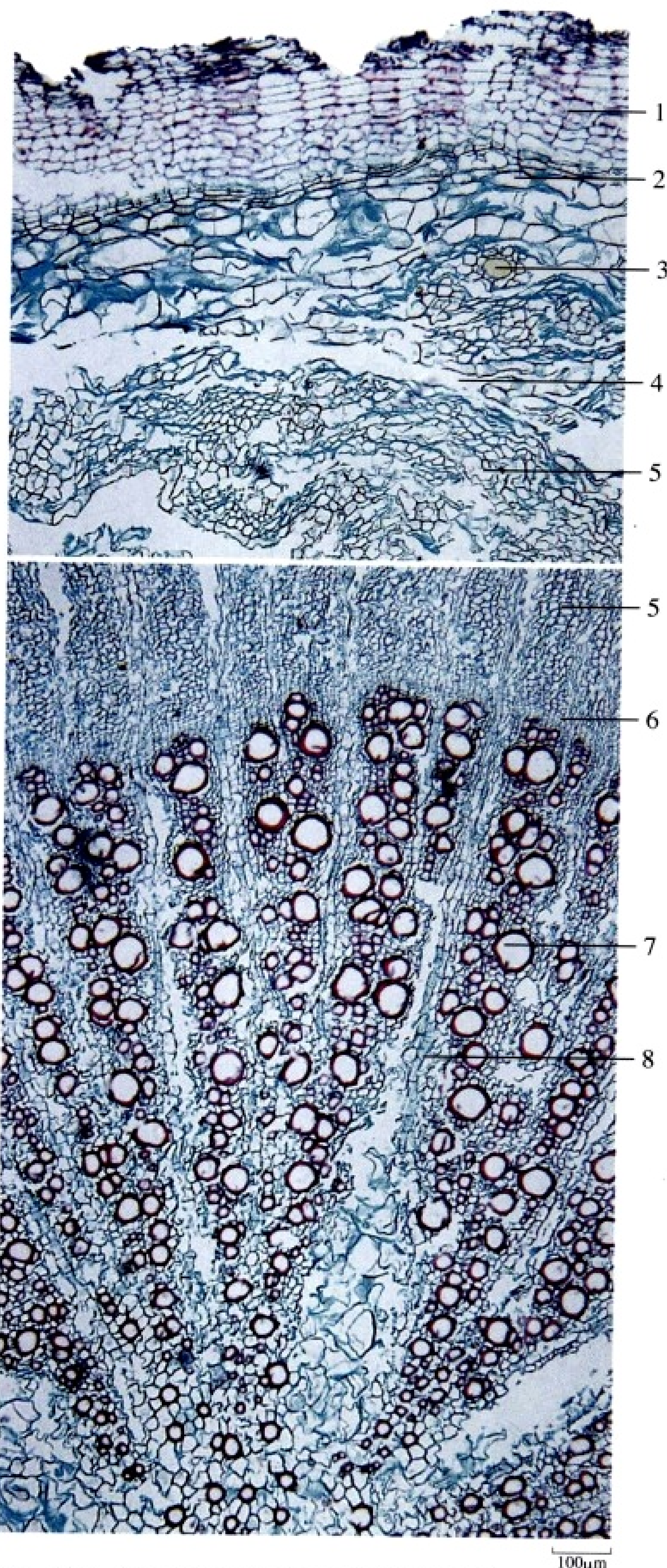


图1　防风（*Saposhnikovia divaricata* 根）横切面

[Fig1　Transverse section of root from *Saposhnikovia divaricata*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 油管（Vitta）
4. 裂隙（Clefts）　5. 韧皮部（Phloem）　6. 形成层（Cambium）
7. 木质部（Xylem）　8. 木射线（Xylem rays）

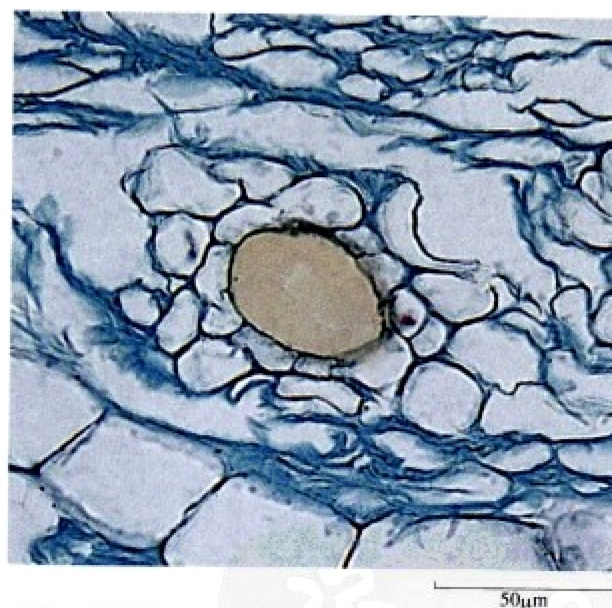


图2　示油管

[Fig2　Showing vitta]

本品粉末：淡棕色。油管直径17～60μm，充满金黄色分泌物。叶基维管束常伴有纤维束。网纹导管直径14～85μm。石细胞少见，黄绿色，长圆形或类长方形，壁较厚。(图3)

Powder: Brownish. Vittae 17～60 μm in diameter, filled with gold secretion. Vascular bundles of leaf bases usually accompanied by fibre bundles. Reticulated vessels 14～85 μm in diameter. Stone cells infrequent, yellowish-green and oblong or subrectangular, with thicker walls. (Fig 3)

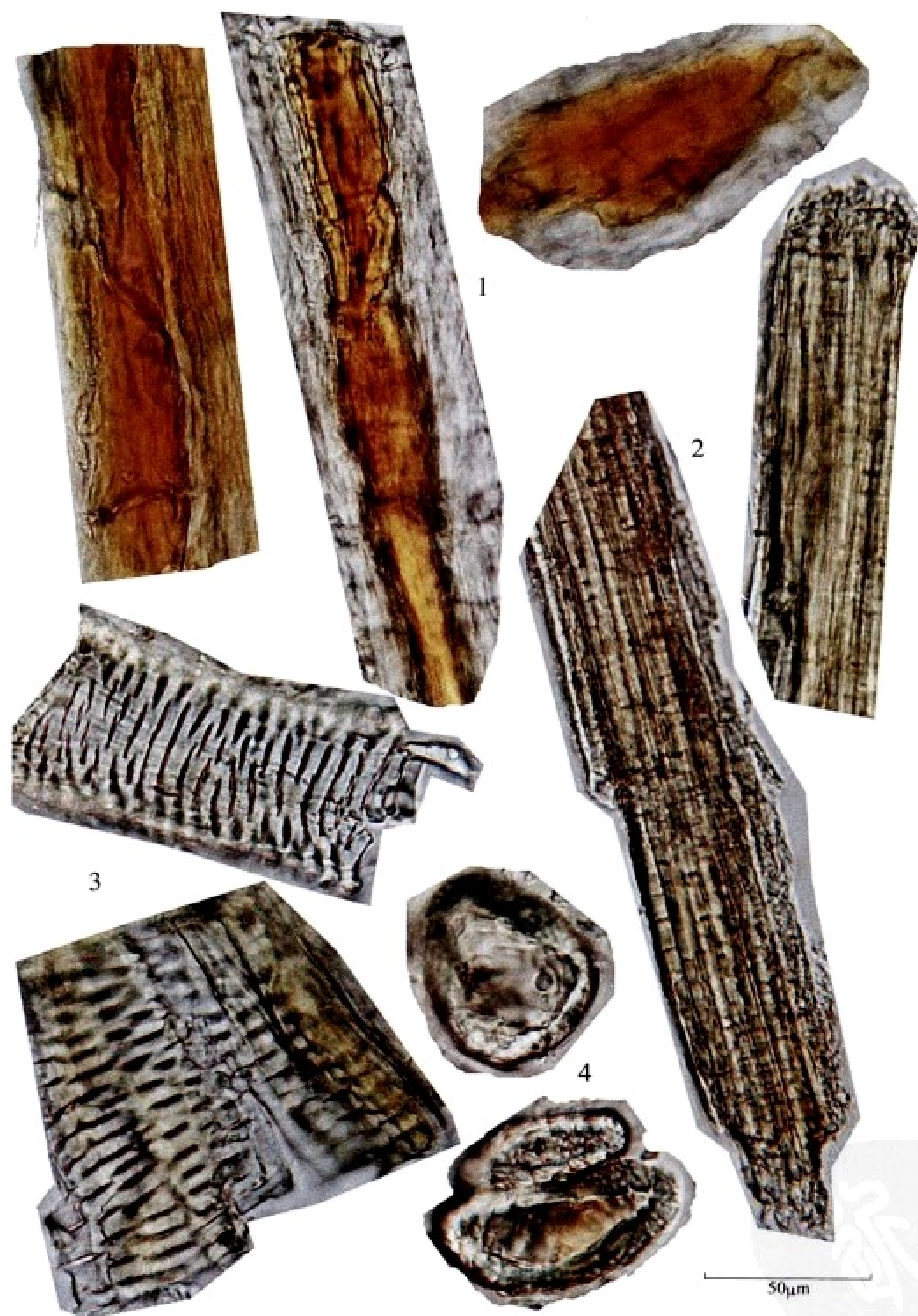
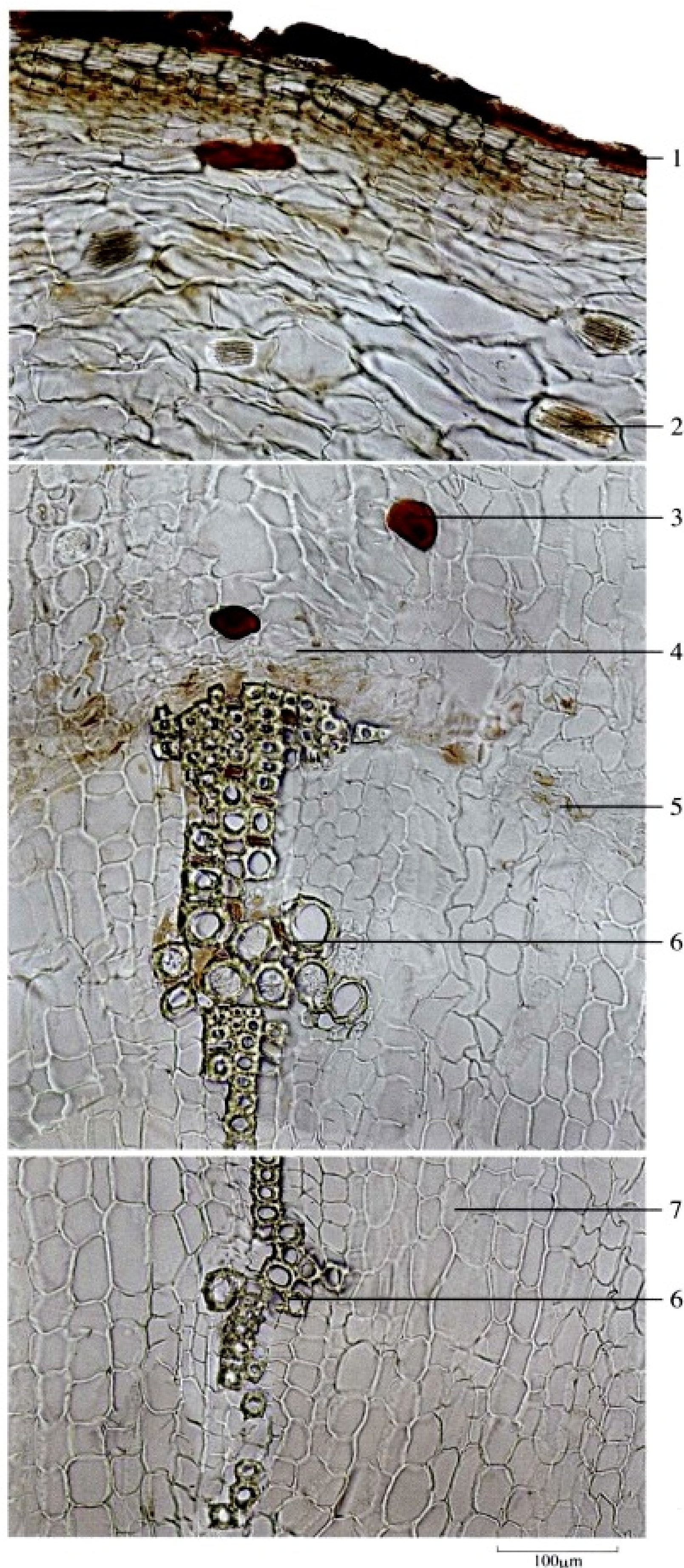


图3 防风（*Saposhnikovia divaricata* 根）粉末

[Fig3 Powder of root from *Saposhnikovia divaricata*]

1. 油管（Vittae） 2. 叶基纤维（Fibres of leaf bases） 3. 导管（Vessels） 4. 石细胞（Stone cells）

红　大　戟
Hongdaji
RADIX KNOXIAE



本品为茜草科植物红大戟*Knoxia valerianoides* Thorel et Pitard 的干燥块根。

[显微特征] 本品横切面：木栓细胞数列。韧皮部宽广。形成层成环。木质部导管束断续径向排列，近形成层处者由数列导管组成，渐向内呈单列或单个散在。射线较宽。薄壁组织中散在含草酸钙针晶束的黏液细胞及含红棕色物的分泌细胞。（图1）

Transverse section: Cork consisting of several layers of cells. Phloem broad. Cambium in a ring. Xylem vessel bundles arranged interruptedly and radially, consisting of several rows of vessels near cambium, inward vessels gradually in one row or scattered singly; rays very broad. Parenchyma scattering mucilage cells containing raphides of calcium oxalate, and secretory cells containing reddish brown secretion.（Fig 1）

图1　红大戟（*Knoxia valerianoides* 块根）横切面
[Fig1　Transverse section of root from *Knoxia valerianoides*]
1. 木栓层（Cork layer）　2. 草酸钙针晶束（Raphide of calcium oxalate）
3. 分泌细胞（Secretory cell）　4. 韧皮部（Phloem）　5. 形成层（Cambium）
6. 木质部（Xylem）　7. 射线（Xylem ray）

红　花
Honghua
FLOS CARTHAMI

本品为菊科植物红花*Carthamus tinctorius* L. 的干燥花。

[显微特征] 本品粉末：橙黄色。花冠、花丝、柱头碎片多见，长管状分泌细胞常位于导管旁，直径约至66μm，含黄棕色至红棕色分泌物。花冠裂片顶端表皮细胞外壁突起呈短绒毛状。柱头及花柱上部表皮细胞分化成圆锥形单细胞毛，先端尖或稍钝。花粉粒类圆形、椭圆形或橄榄形，直径约至60μm，具3个萌发孔，外壁有齿状突起。草酸钙方晶存在于薄壁细胞中，直径2～6μm 。(图1)

Powder: Orange-yellow. The fragments of corolla, filament and stigma frequently visible. Long tubular secretory cells lying near vessels, up to 66 μm in diameter, containing yellowish-brown to reddish-brown secretion. Outer walls of terminal epidermal cells of corolla lobes projecting to be tomentellate. Upper epidermal cells of stigma and style differentiated into conical unicellular hairs, acuminate or slightly obtuse at the apex. Pollen grains subrounded, elliptical or olivary, up to 60 μm in diameter, with 3 germinal pores, exine dentate-spinose. Prisms of calcium oxalate occurring in parenchymatous cells, 2～6 μm in diameter. (Fig 1)



图1　红花（*Carthamus tinctorius* 花）粉末

[Fig1　Powder of flower from *Carthamus tinctorius*]

1. 分泌细胞（Secretory cells）　2. 花冠裂片顶端表皮细胞（Terminal epidermal cells of corolla lobes）
3. 柱头及花柱表皮细胞（Epidermal cells of stigma and style）　4. 花粉粒（Pollen grains）
5. 草酸钙方晶（Prisms of calcium oxalate）

红　　芪

Hongqi

RADIX HEDYSARI

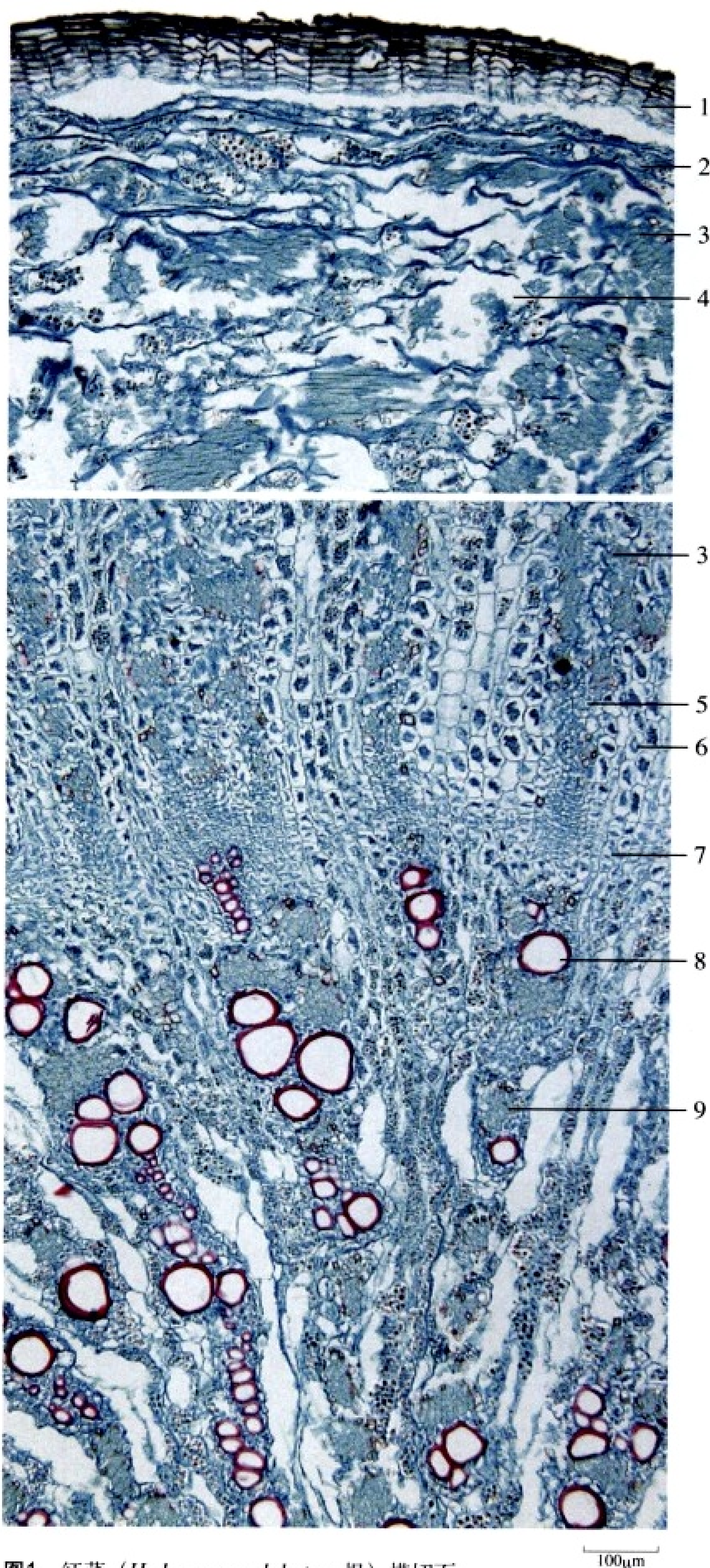


图1　红芪（*Hedysarum polybotrys* 根）横切面

[Fig1　Transverse section of root from *Hedysarum polybotrys*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮纤维束（Phloem fibre bundles）　4. 裂隙（Clefts）　5. 韧皮部（Phloem）　6. 韧皮射线（Phloem rays）　7. 形成层（Cambium）　8. 木质部（Xylem）　9. 木纤维束（Xylem fibre bundles）

本品为豆科植物多序岩黄芪*Hedysarum polybotrys* Hand.–Mazz. 的干燥根。

[显微特征]　本品横切面：木栓层为6～8列细胞。栓内层狭窄，外侧有2～4列厚角细胞。韧皮部较宽，外侧有裂隙，纤维成束散在，纤维壁厚，微木化；韧皮射线外侧常弯曲。形成层成环。木质部导管单个散在或2～ 3 个相聚，其周围有木纤维。纤维束周围细胞含草酸钙方晶。（图1、2）

Transverse section: Cork consisting of 6 ~ 8 layers of cells. Phelloderm narrow, with 2 ~ 4 layers of collenchmatous cells at the outside. Phloem broader, with clefts at the outer part, fibres in bundles and scattered, with thickened walls, slightly lignified; phloem rays often curved outside. Cambium in a ring. Vessels in xylem singly scattered or 2 ~ 3 cells grouped, surrounded by xylary fibres. Fibre bundles surrounded by cells containing prisms of calcium oxalate. (Fig 1, 2)

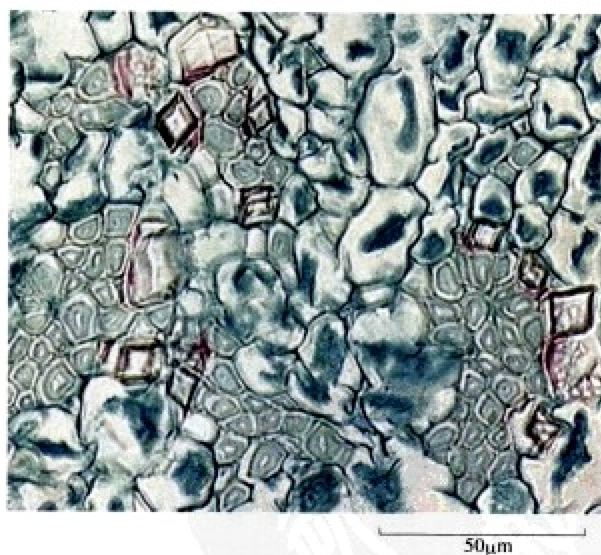


图2　示纤维束周围细胞含草酸钙方晶

[Fig2　Showing Fibre bundles surrounded by cells containing prisms of calcium oxalate]

本品粉末：黄棕色。纤维成束，直径5～22μm，壁厚，微木化，周围细胞含草酸钙方晶，形成晶纤维，含晶细胞壁不均匀增厚。草酸钙方晶直径7～14μm，长约至22μm。具缘纹孔导管直径至145μm。淀粉粒单粒类圆形或卵圆形，直径2～19μm；复粒由2～8分粒组成。(图3)

Powder: Yellowish-brown. Fibres in bundles, 5～22 μm in diameter, with thickened walls, slightly lignified, surrounded by cells containing calcium oxalate prisms, forming crystal fibres, the walls of crystal cells unevenly thickened. Prisms of calcium oxalate 7～14 μm in diameter, up to 22 μm long. Bordered pitted vessels up to 145 μm in diameter. Simple starch granules subrounded or ovoid rounded, 2～19 μm in diameter; compound granules of 2～8 components. (Fig 3)



图3 红芪（*Hedysarum polybotrys* 根）粉末

[Fig3 Powder of root from *Hedysarum polybotrys*]

1. 晶纤维（Crystal fibres） 2. 草酸钙方晶（Prisms of calcium oxalate） 3. 导管（Vessels） 4. 淀粉粒（Starch granules）

红 豆 蔻

Hongdoukou

FRUCTUS GALANGAE

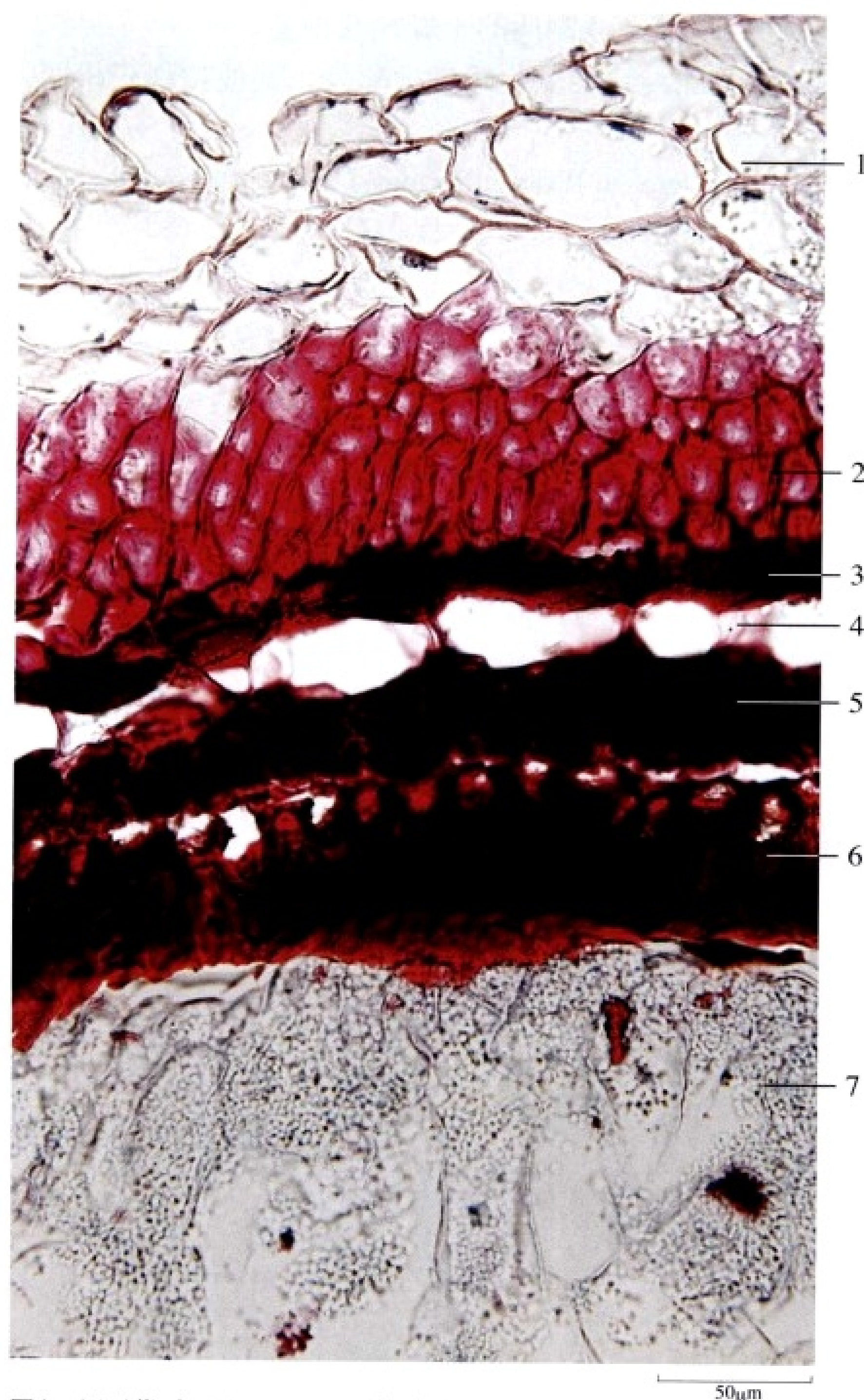


图1 红豆蔻（*Alpinia galanga* 种子）横切面

[Fig1 Transverse section of seed from *Alpinia galanga*]

1. 假种皮（Aril） 2. 种皮的外层（Outer part of testa） 3. 色素细胞（Pigment cells）
4. 油细胞（Oil cells） 5. 色素层（Pigment layer）
6. 内种皮栅状厚壁细胞（Thick-walled palisade cells of tegmen）
7. 外胚乳细胞（Perisperm cells）

本品为姜科植物大高良姜*Alpinia galanga* Willd. 的干燥成熟果实。

[显微特征] **种子横切面**：假种皮细胞 4～7列，圆形或切向延长，壁稍厚。种皮的外层为1～5列非木化厚壁纤维，呈圆形或多角形，直径13～45μm，其下为1列扁平的黄棕色或深棕色色素细胞；油细胞1列，方形或长方形，直径16～54μm；色素层细胞3～5列，含红棕色物；内种皮为1列栅状厚壁细胞，长约65μm，宽约30μm，黄棕色或红棕色，内壁及靠内方的侧壁极厚，胞腔偏外侧，内含硅质块。外胚乳细胞充满淀粉粒团，偶见草酸钙小方晶。内胚乳细胞含糊粉粒及脂肪油滴。（图1）

Transverse section of seed: Aril consisting of 4 ~ 7 layers of cells, rounded or tangentially elongated, with slightly thickened walls. The outer part of testa consisting of 1 ~ 5 layers of unlignified and thick walled fibres, rounded or polygonal, 13 ~ 45μm in diameter, beneath them showing 1 layer of flattened, yellowish-brown or dark brown pigment cells; oil cells in 1 layer, square or rectangular, 16 ~ 54 μm in diameter; pigment layer consisting of 3 ~ 5 layers of cells containing reddish-brown contents; tegmen consisting of 1 layer of thick-walled palisade cells, about 65μm long, 30μm wide, yellowish-brown or reddish-brown, the inner and lateral walls of inner part strongly thickened, lumina containing silica masses. The cells of perisperm filled with masses of starch granules and occasionally containing small prisms of calcium oxalate. The cells of endosperm containing aleurone grains and oil droplets.（Fig 1）

红　　参

Hongshen

RADIX ET RHIZOMA GINSENG RUBRA

本品为五加科植物人参*Panax ginseng* C. A. Mey. 的栽培品经蒸制后的干燥根及根茎。

[显微特征] 本品粉末：照人参〔显微特征〕项试验，除淀粉粒糊化轮廓模糊外，其他特征应相同。（图1）

Powder: Carry out the method of test（1）for Identification in the monograph of Radix et Rhizoma Ginseng. It shows the same characteristics except the starch granules gelatinized.（Fig 1）

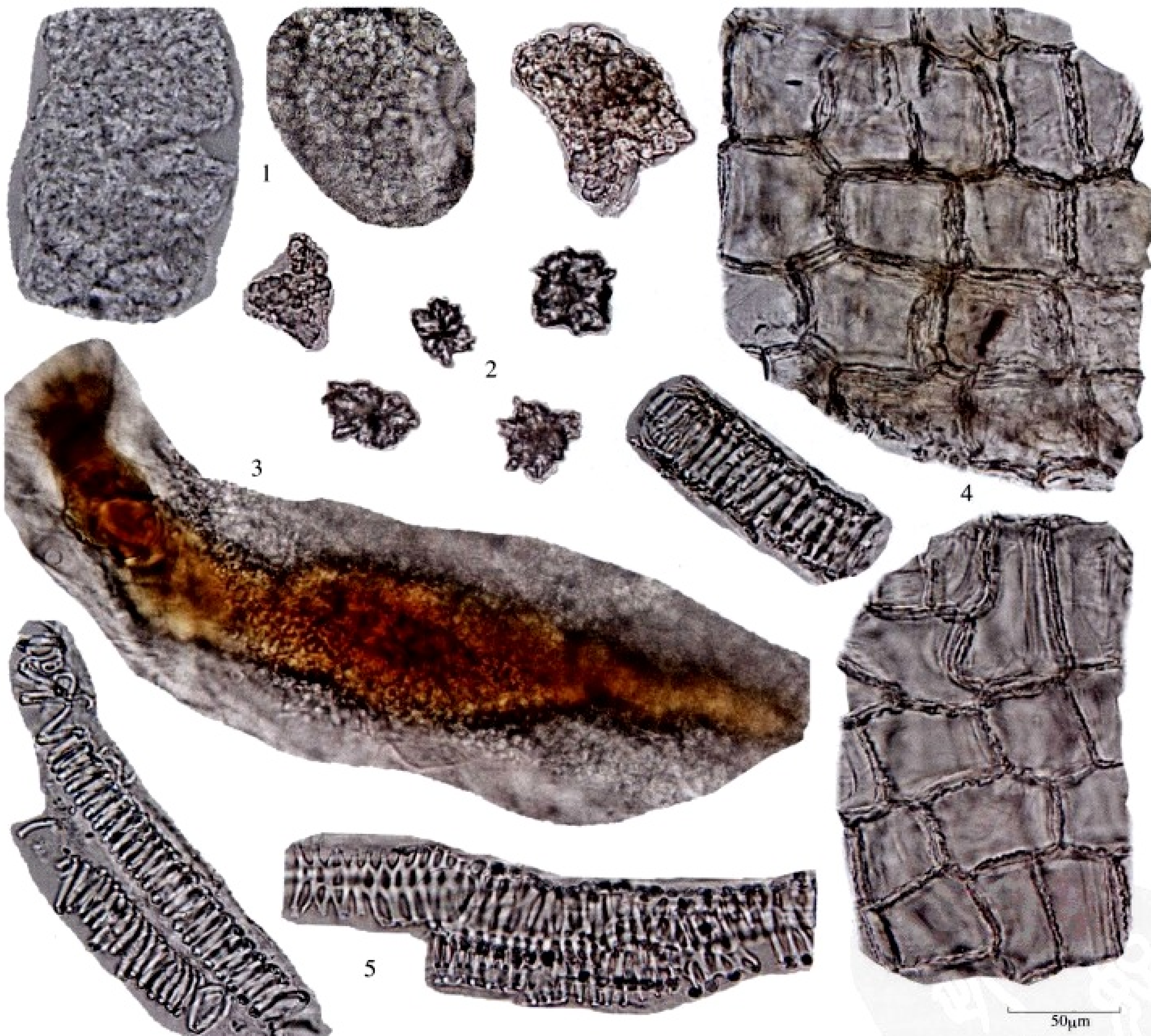


图1　红参（*Panax ginseng* 蒸制后的根）粉末

[Fig1　Powder of the prepared root from *Panax ginseng*]

1. 糊化淀粉粒（Gelatinized starch granules）　2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 树脂道（Resin ducts）　4. 木栓细胞（Cork cells）　5. 导管（Vessels）

附注：本品横切面组织图见人参。

红　景　天

Hongjingtian

RADIX ET RHIZOMA RHODIOLAE CRENULATAE

本品为景天科植物大花红景天*Rhodiola crenulata*（Hook. f. et Thoms.）H. Ohba 的干燥根及根茎。

[显微特征] 本品根横切面：木栓层5～8列细胞，栓内层细胞椭圆形、类圆形，中柱占极大部分，有多数维管束排列成2～4轮环，外轮维管束较大，为外韧型；内侧2～3轮维管束渐小，为周木型。

Transverse section of root: Cork of 5～8 layers of cells. Phelloderm cells elliptic or subrounded. Stele very broad, numerous vascular bundles arranged in 2～4 rings, outer ring consisting of collateral vascular bundles and relatively large, other 2～3 rings of amphivasal type and gradually smaller toward inside.

根茎横切面：老根茎有2～3条木栓层带，嫩根茎无木栓层带。木栓层为数列细胞，栓内层不明显。皮层窄。中柱维管束为大型的周韧型维管束，放射状环列；维管束中内侧和外侧的维管组织发达呈对列状，中间为薄壁组织，韧皮部和木质部近等长，被次生射线分隔成细长条形，形成层明显。髓部宽广，由薄壁细胞组成，散生周韧型的髓维管束。薄壁细胞含有棕色物。（图1～3）

Transverse section of rhizome: Two to three rings of cork layer presented in old rhizome and absent in young rhizome. Cork consisting of several cells, phelloderm indistinct. Cortex narrow. Vascular cylinder consisting of large amphicribral vascular bundles, bundles radially arranged in a ring; outer and inner vascular tissues of each bundle well developed and oppositely arranged, parenchymatous cells in the middle, phloem and xylem nearly equaled in length and being divided into slim shape by secondary rays; cambium distinct. Pith broad, consisting of parenchymatous cells, scattering amphicribral vascular bundles. Parenchymatous cells containing brown contents.（Fig 1～3）



图1　红景天（*Rhodiola crenulata* 根茎）横切面

[Fig1　Transverse section of rhizome from *Rhodiola crenulata*]

1. 木栓层（Cork）　2. 皮层（Cortex）　3. 初生射线（Primary rays）　4. 中柱维管束（Stele vascular bundles）　5. 髓（Pith）　6. 髓维管束（Pith vascular bundles）

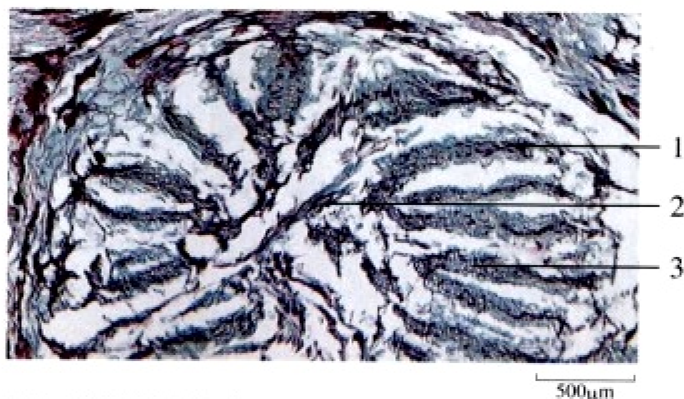


图3　髓维管束放大

[Fig3　Pith vascular bundle magnified]

1. 韧皮部（Phloem）　2. 薄壁组织（Parenchyma）　3. 木质部（Xylem）

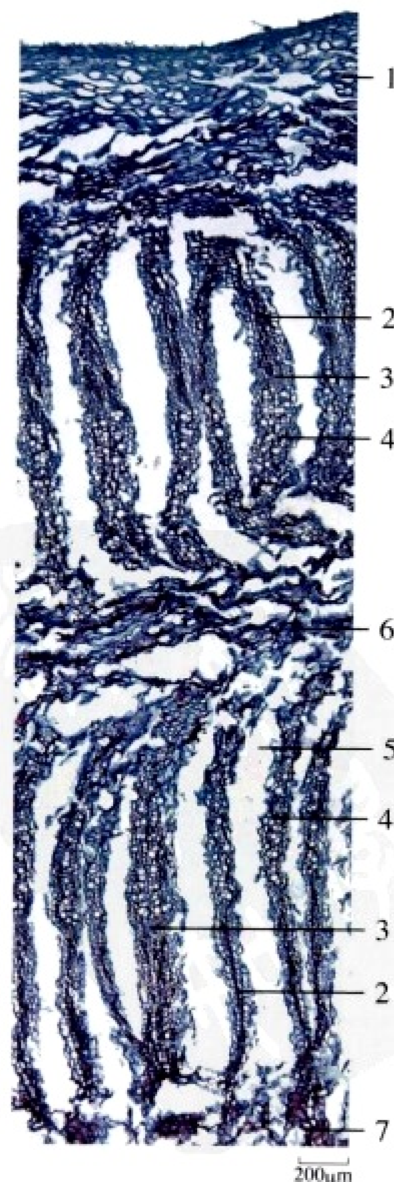


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 皮层（Cortex）　2. 韧皮部（Phloem）　3. 形成层（Cambium）　4. 木质部（Xylem）　5. 次生射线（Secondary rays）　6. 薄壁组织（Parenchyma）　7. 髓（Pith）

麦 冬

Maidong

RADIX OPHIOPOGONIS

本品为百合科植物麦冬*Ophiopogon japonicus*（Thunb.）Ker-Gawl. 的干燥块根。

[显微特征] 本品横切面：表皮细胞1列，根被为3～5列木化细胞。皮层宽广，散有含草酸钙针晶束的黏液细胞，有的针晶直径至10μm；内皮层细胞壁均匀增厚，木化，有通道细胞，外侧为1列石细胞，其内壁及侧壁增厚，纹孔细密。中柱较小，韧皮部束16～22个，木质部由导管、管胞、木纤维以及内侧的木化细胞连结成环层。髓小，薄壁细胞类圆形。（图1、2）

Transverse section: Epidermis consisting of 1 layer of cells. Velamen of 3 ~ 5 layers of lignified cells. Cortex broad, scattered with mucilage cells containing raphides of calcium oxalate, some needles up to 10 μm in diameter; endodermis with passage cells, endodermal cells with evenly thickened and lignified walls; and a layer of stone cells lying at the outside of endodermis, the inner and lateral walls thickened, finely and densely pitted. Stele relatively small. Phloem bundles 16～22. Vessels, tracheids, fibres and lignified parenchymatous cells in the inner side of xylem linking up to a ring. Pith small, parenchymatous cells subrounded. (Fig 1, 2)

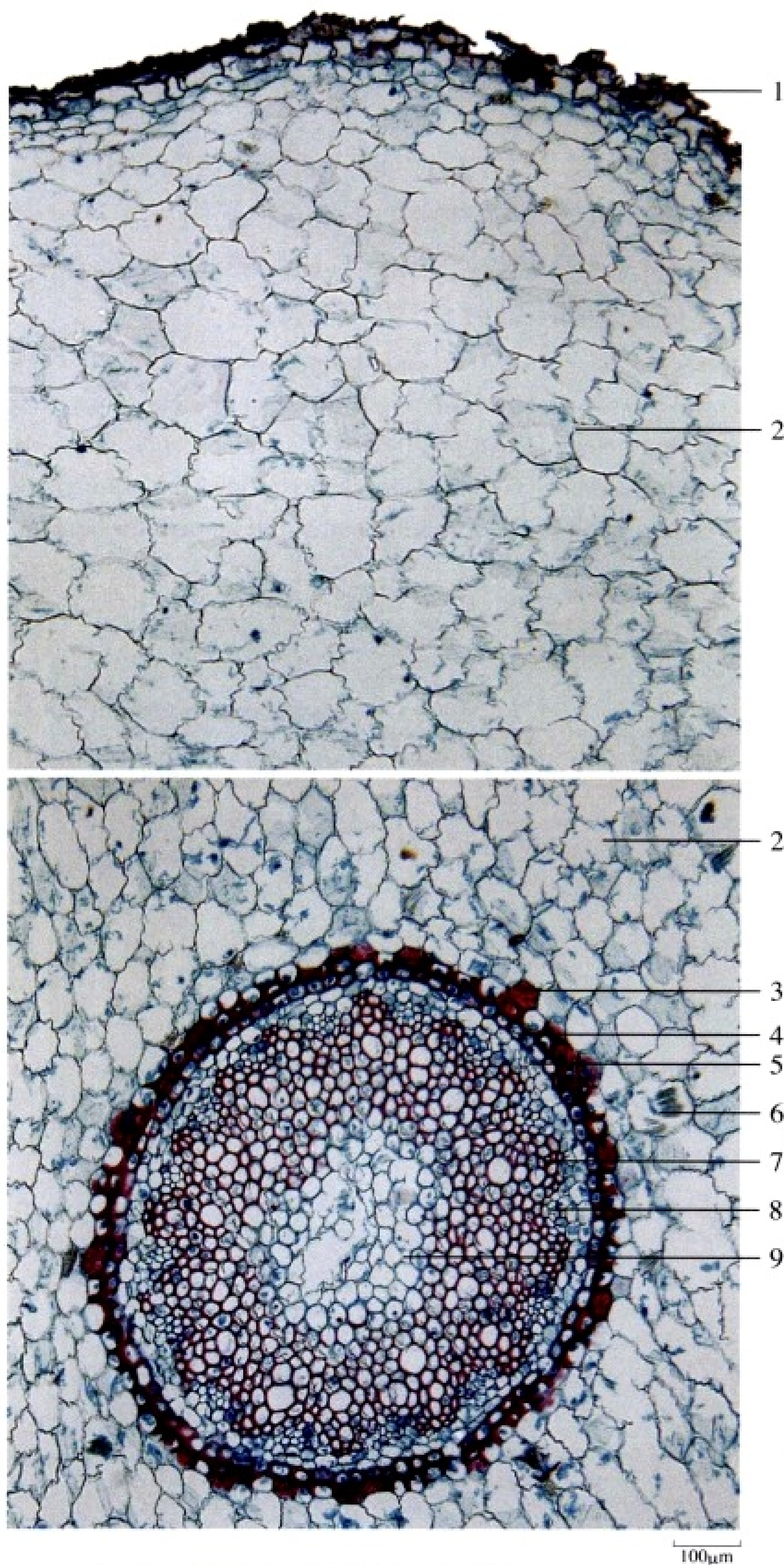


图1 麦冬（*Ophiopogon japonicus* 块根）横切面

[Fig1 Transverse section of root tuber from *Ophiopogon japonicus*]

1. 根被（Velamen） 2. 皮层（Cortex） 3. 石细胞层（Layer of stone cells） 4. 内皮层（Endodermis） 5. 中柱鞘（Pericycle） 6. 草酸钙针晶束（Raphides of calcium oxalate） 7. 木质部（Xylem） 8. 韧皮部（Phloem） 9. 髓（Pith）

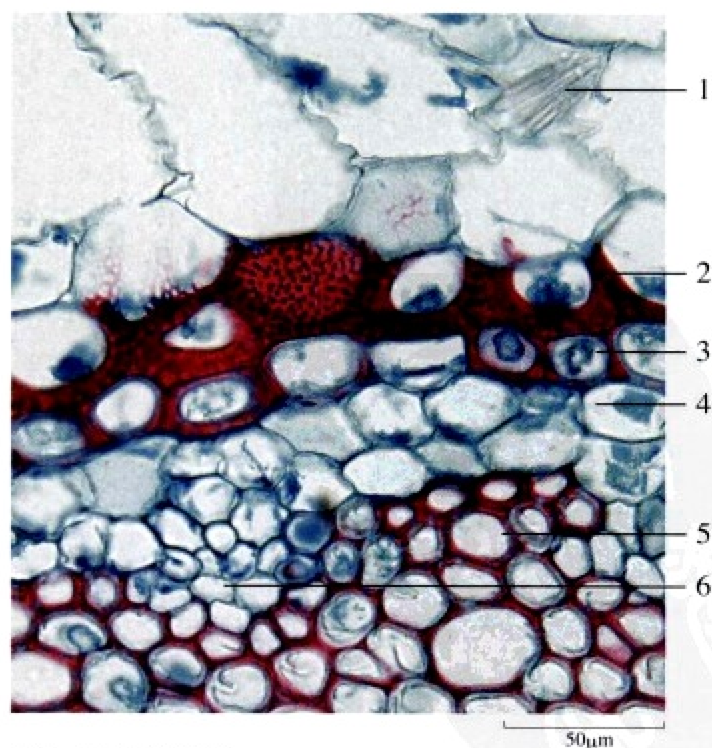


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 草酸钙针晶束（Raphides of calcium oxalate） 2. 石细胞（Stone cells） 3. 内皮层细胞（Endodermal cells） 4. 中柱鞘细胞（Pericycle cells） 5. 木质部束（Xylem bundles） 6. 韧皮部束（Phloem bundles）

远　　志

Yuanzhi

RADIX POLYGALAE



图1　远志（*Polygala tenuifolia* 根）横切面

[Fig1　Transverse section of root from *Polygala tenuifolia*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮部（Phloem）

4. 形成层（Cambium）　5. 木射线（Xylem rays）　6. 木质部导管（Xylem vessels）

本品为远志科植物远志*Polygala tenuifolia* Willd. 或卵叶远志*Polygala sibirica* L. 的干燥根。

[显微特征]　本品横切面：木栓细胞10余列。栓内层为20余列薄壁细胞，有切向裂隙。韧皮部较宽广，常现径向裂隙。形成层成环。木质部发达，均木化，射线宽1～3列细胞。薄壁细胞大多含脂肪油滴；有的含草酸钙簇晶及方晶。（图1、2）

Transverse section: Cork consisting of 10 or more layers of cells. Phelloderm of 20 or more layers of parenchymatous cells, with tangentialy clefts. Phloem relatively broad, usually with radial clefts. Cambium in a ring. Xylem well developed, all lignified, rays 1～3 layers of cells wide. Parenchymatous cells mostly containing fatty oil drops; some containing clusters and prisms of calcium oxalate.（Fig 1, 2）

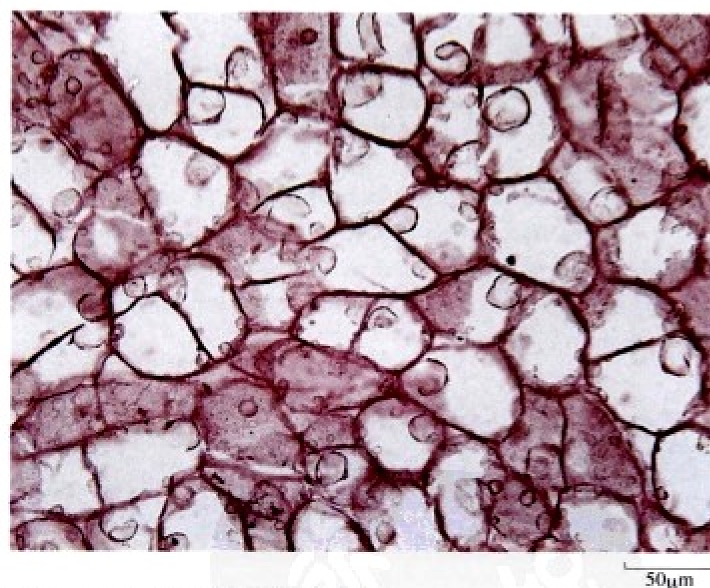


图2　示薄壁细胞含脂肪油滴

[Fig2　Showing parenchymatous cells containing fatty oil drops]

赤 小 豆

Chixiaodou

SEMEN PHASEOLI

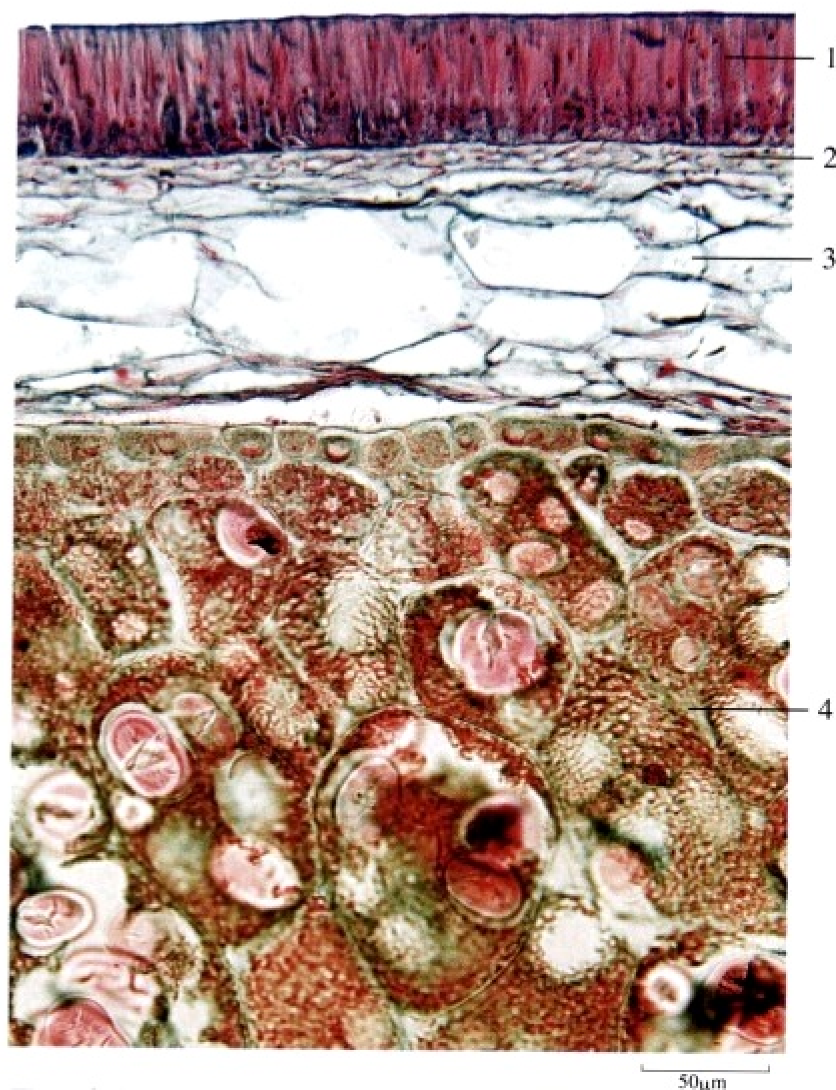


图1 赤小豆（*Phaseolus calcaratus* 种子）横切面

[Fig1 Transverse section of seed from *Phaseolus calcaratus*]

1. 种皮表皮栅状细胞（Epidermal palisade cells of testa）
2. 支持细胞（Supporting cells） 3. 薄壁细胞（Parenchymatous cells）
4. 子叶细胞（Cotyledon cells）

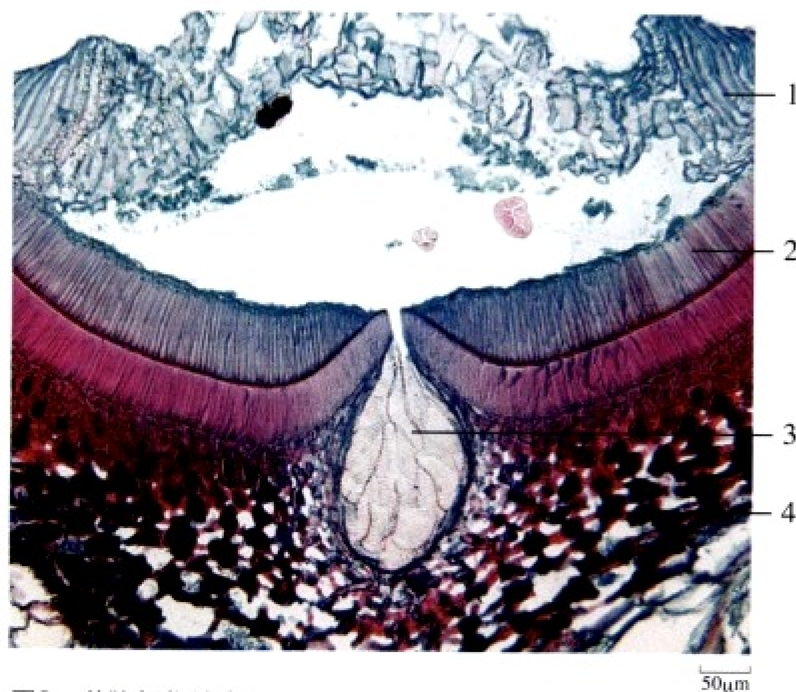


图2 种脐部位放大

[Fig2 Hilum part magnified]

1. 种阜（Caruncle） 2. 种皮表皮栅状细胞（Epidermal palisade cells of testa）
3. 管胞岛（Tracheid island） 4. 星状组织（Actinenchyma）

本品为豆科植物赤小豆 *Phaseolus calcaratus* Roxb. 或赤豆 *Phaseolus angularis* Wight. 的干燥成熟种子。

[显微特征] 本品横切面：赤小豆种皮表皮为1列栅状细胞，种脐处2列，细胞内含淡红棕色物，光辉带明显。支持细胞1列，呈哑铃状，其下为10列薄壁细胞，内侧细胞呈颓废状。子叶细胞含众多淀粉粒，并含有细小草酸钙方晶和簇晶。种脐部位栅状细胞的外侧有种阜，内侧有管胞岛，椭圆形，细胞壁网状增厚，其两侧为星状组织，细胞呈星芒状，有大型细胞间隙。（图1～3）

Transverse section: Epidermis of testa consisting of 1 layer of palisade cells, 2 layers in hilum, containing reddish-brown substances, a light band distinct. Supporting cells 1 layer, dumbbell-shaped, underneath ranged 10 layers of parenchymatous cells with the inner cells dilapidated. Cotyledon cells containing numerous starch granules and fine prisms and clusters of calcium oxalate. In hilum, a caruncle occurring outside the palisade cells and a tracheid island inside; the tracheid island elliptical, cell walls reticulate thickened, with actinenchyma in both sides, cells stellar, with large intercellular space. (Fig 1～3)

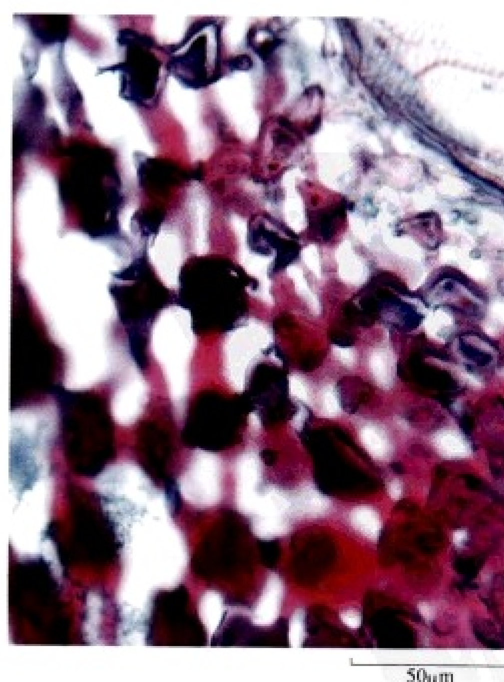


图3 示星状组织

[Fig3 Showing actinenchyma]

赤　芍

Chishao

RADIX PAEONIAE RUBRA

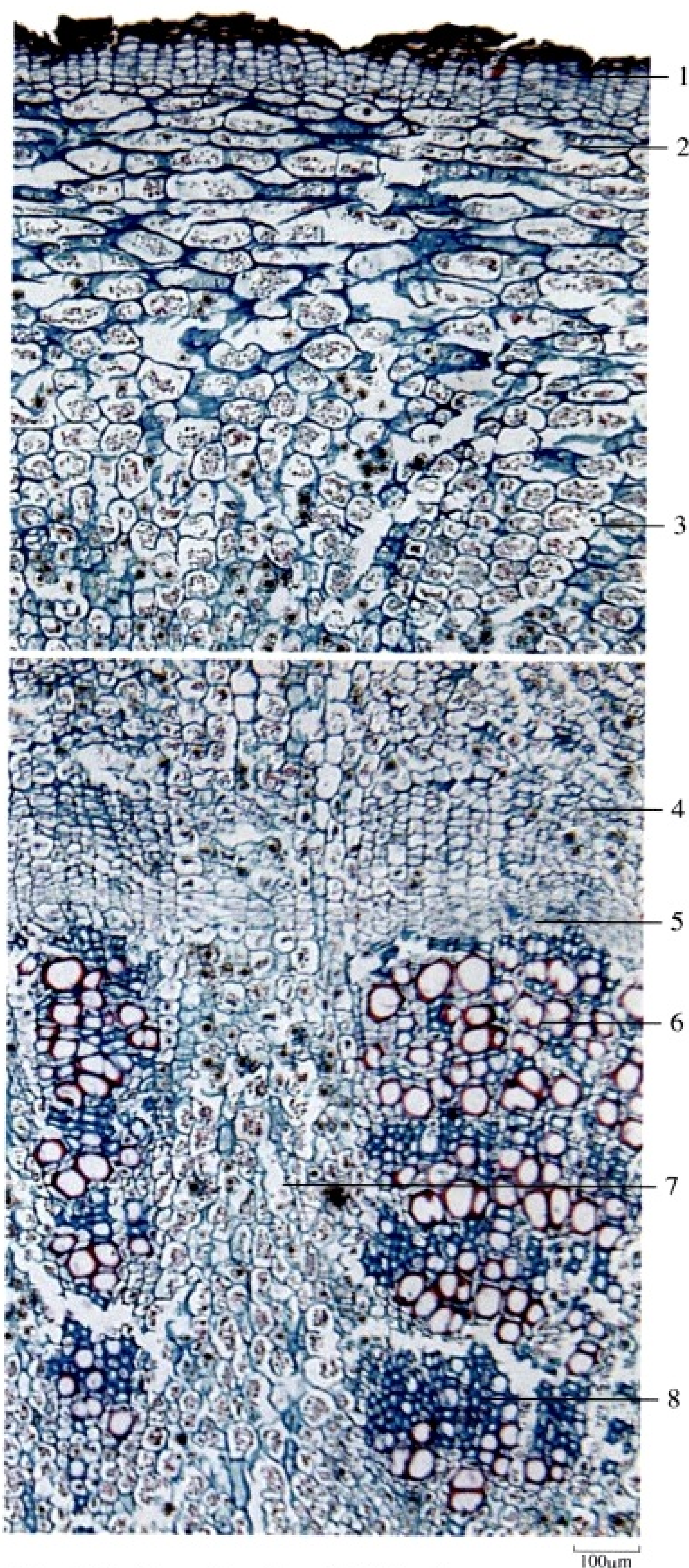


图1　赤芍（*Paeonia lactiflora* 根）横切面

[Fig1　Transverse section of root from *Paeonia lactiflora*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮部（Phloem）
4. 韧皮部筛管群（Sieve tube groups of phloem）　5. 形成层（Cambium）
6. 木质部导管（Xylem vessels）　7. 木射线（Xylem rays）
8. 木纤维（Xylem fibres）

本品为毛茛科植物芍药*Paeonia lactiflora* Pall.或川赤芍*Paeonia veitchii* Lynch的干燥根。

[显微特征]　本品横切面：木栓层为数列棕色细胞。栓内层薄壁细胞切向延长。韧皮部较窄。形成层成环。木质部射线较宽，导管群作放射状排列，导管旁有木纤维。薄壁细胞含草酸钙簇晶，并含淀粉粒。（图1、2）

Transverse section: Cork consisting of a few layers of brown cells. Parenchymatous cells in phelloderm elongated tangentially. Phloem relatively narrow. Cambium in a ring. Xylem rays relatively broad, vessels arranged radially, accompanied by wood fibres. Parenchymatous cells containing clusters of calcium oxalate and starch granules. (Fig 1, 2)

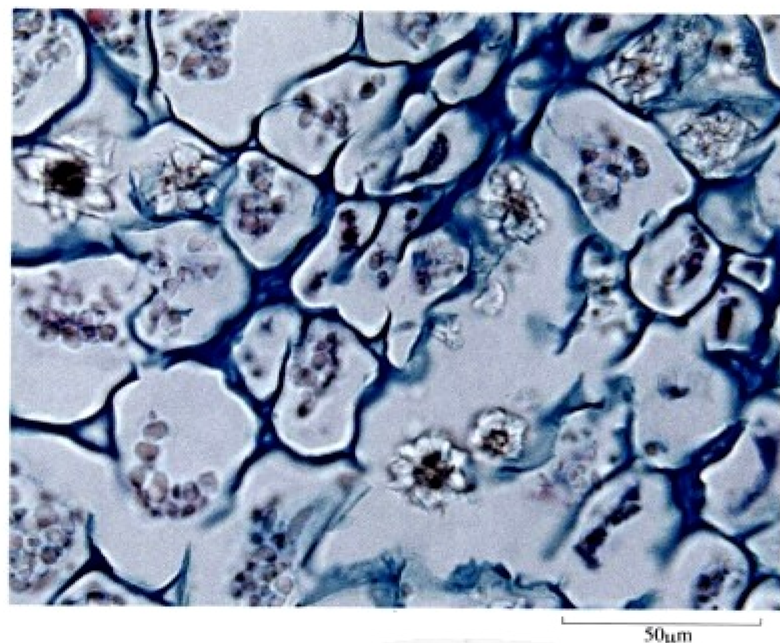


图2　示薄壁细胞含草酸钙簇晶及淀粉粒

[Fig2　Showing parenchymatous cells containing clusters of calcium oxalate and starch granules]

芫　　花

Yuanhua

FLOS GENKWA

本品为瑞香科植物芫花*Daphne genkwa* Sieb. et Zucc. 的干燥花蕾。

[显微特征] 本品粉末：灰褐色：花粉粒黄色，类球形，直径23～45μm，表面有较明显的网状雕纹，萌发孔多数，散在。花被下表面有非腺毛，单细胞，多弯曲，长88～780μm，直径15～23μm，壁较厚，微具疣状突起。（图1）

Powder: Pollen grains yellow, subspherical, 23～45 μm in diameter, exine with distinct reticulate sculptures, numerous germinal apertures scattered. Lower surface of perianth bearing non-glandular hairs, unicellular, usually curved, 88～780 μm long, 15～23 μm in diameter, walls relatively thick, slightly warty.（Fig 1）



图1　芫花（*Daphne genkwa* 花蕾）粉末

[Fig1　Powder of flower bud from *Daphne genkwa*]

1. 花粉粒（Pollen grains）　2. 非腺毛（Non-glandular hairs）

芥　　子

Jiezi

SEMEN SINAPIS

本品为十字花科植物白芥*Sinapis alba* L. 或芥*Brassica juncea*（L.）Czern. et Coss. 的干燥成熟种子。

[显微特征] 本品横切面： 白芥子　种皮表皮为黏液细胞，有黏液质纹理；下皮为2列厚角细胞；栅状细胞1列，内壁及侧壁增厚，外壁菲薄。内胚乳为1列类方形细胞，含糊粉粒。子叶及胚根薄壁细胞含脂肪油滴及糊粉粒。（图1）

Transverse section: Seed of *Sinapis alba*: Epidermis of testa consisting of mucilage cells with mucilaginous striations; hypodermis consisting of 2 layers of collenchyma cells; palisade cells consisting of 1 layer of cells with thickened inner and lateral walls and thin outer walls. Endosperm consisting of 1 layer subsquare cells, containing aleurone grains. Parenchymatous cells of cotyledons and radicle containing oil droplets and aleurone grains.（Fig 1）

黄芥子　种皮表皮细胞切向延长；下皮为1列菲薄的细胞。

Seed of *Brassica juncea*: Epidermal cells of testa elongated tangentially; hypodermis consisting of 1 layer thin walled cells.

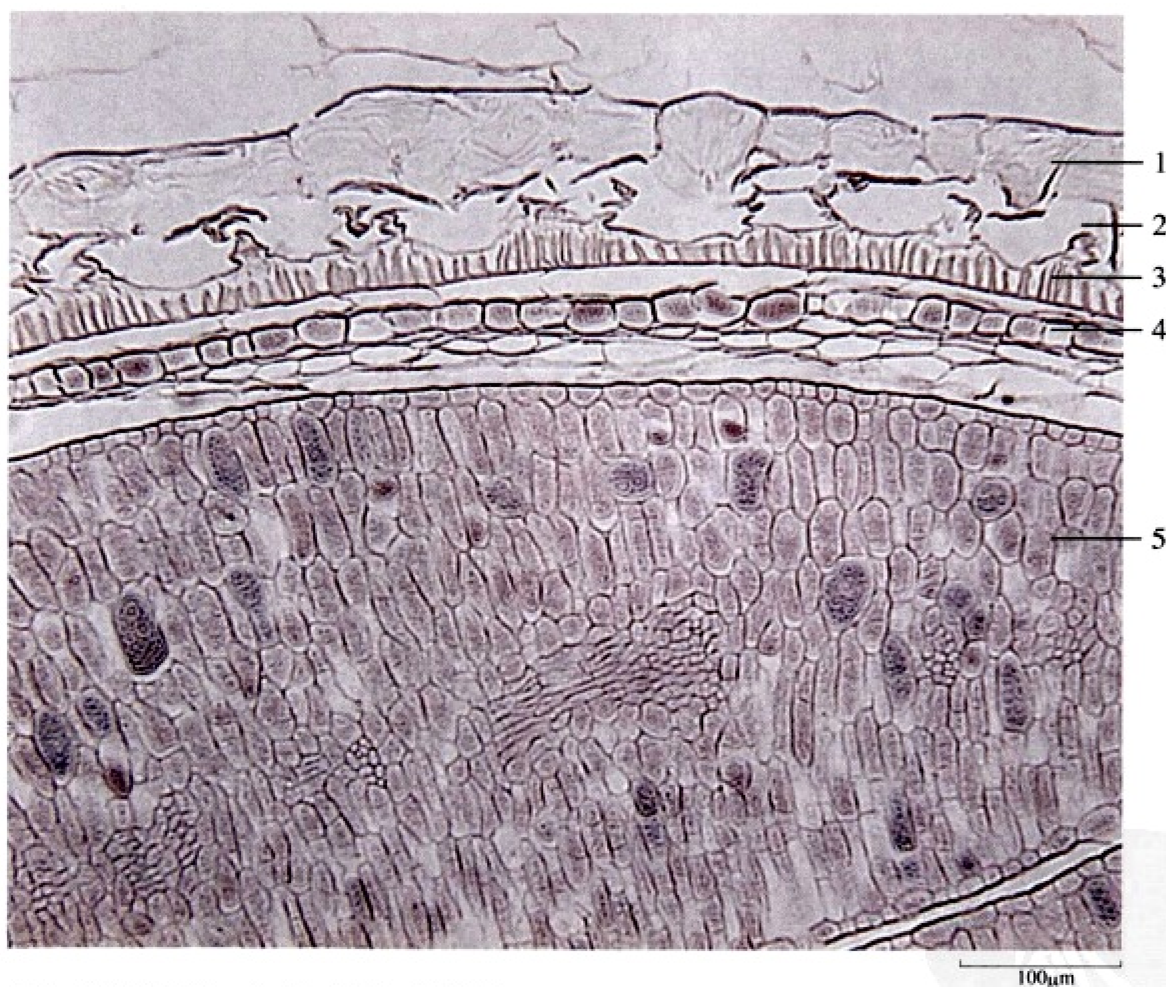


图1　白芥子（*Sinapis alba* 种子）横切面

[Fig1　Transverse section of seed from *Sinapis alba*]

1. 种皮表皮细胞（Epidermal cells of testa）　2. 下皮细胞（Hypodermis cells）

3. 栅状细胞（Palisade cells）　4. 内胚乳细胞（Endosperm cells）　5. 子叶细胞（Cells of cotyledon）

苍　术

Cangzhu

RHIZOMA ATRACTYLODIS

本品为菊科植物茅苍术*Atractylodes lancea*（Thunb.）DC. 或北苍术*Atractylodes chinensis*（DC.）Koidz. 的干燥根茎。

[显微特征] 本品粉末：棕色。草酸钙针晶细小，长5～30μm，不规则地充塞于薄壁细胞中。纤维大多成束，长梭形，直径约至40μm，壁甚厚，木化。石细胞甚多，有时与木栓细胞连结，多角形、类圆形或类长方形，直径20～80μm，壁极厚。菊糖多见，表面呈放射状纹理。（图1）

Powder: Brown. Needle crystals of calcium oxalate minute, 5 ~ 30 μm long, irregularly filled in parenchymatous cells. Fibres mostly in bundles, long fusiform, up to 40 μm in diameter, with rather thickened lignified walls. Stone cells fairly abundant, sometimes linking up with cork cells, polygonal, subrounded or subrectangular, 20 ~ 80 μm in diameter, with heavily thickened walls. Inulin frequently visible, with radial striations on surface. (Fig. 1)

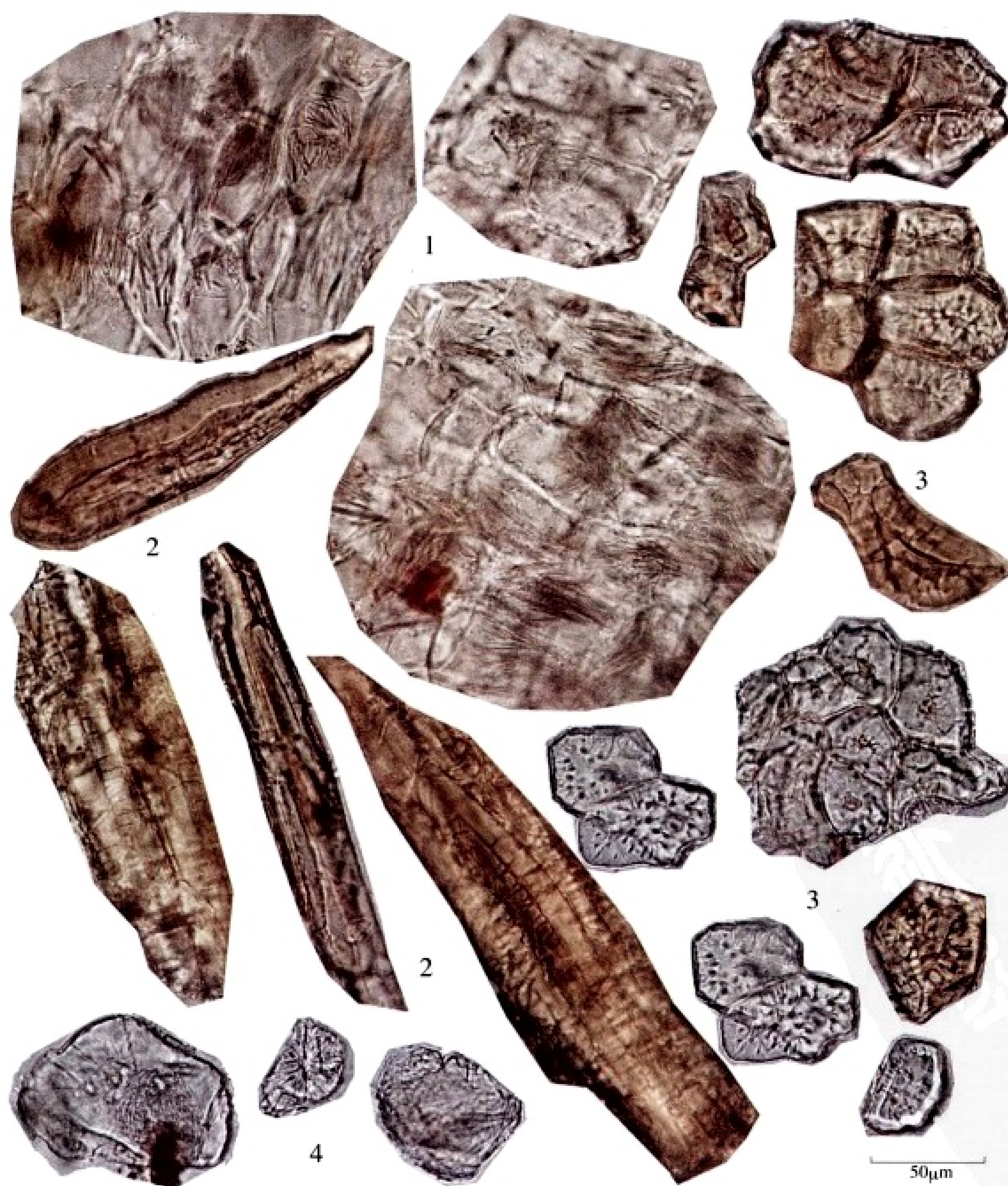


图1　苍术（*Atractylodes lancea* 根茎）粉末

[Fig1　Powder of rhizome from *Atractylodes lancea*]

1. 草酸钙针晶（Needles of calcium oxalate）　2. 纤维（Fibres）　3. 石细胞（Stone cells）　4. 菊糖（Inulin）

苍 耳 子

Cang' erzi

FRUCTUS XANTHII

本品为菊科植物苍耳*Xanthium sibiricum* Patr. 的干燥成熟带总苞的果实。

[显微特征] 本品粉末：淡黄棕色至淡黄绿色。总苞纤维成束，常呈纵横交叉排列。果皮表皮细胞棕色，类长方形，常与下层纤维相连；果皮纤维成束或单个散在，细长梭形，纹孔及孔沟明显或不明显。种皮细胞淡黄色，外层细胞类多角形，壁稍厚；内层细胞具乳头状突起。木薄壁细胞类长方形，具纹孔。子叶细胞含糊粉粒及油滴。（图1）

Powder: Pale yellowish-brown to pale yellowish-green. Fibres of involucrum in bundles, arranged crisscross. Epidermal cells of pericarp brown, subsquare, often linked with fibres; fibres of pericarp gathered in bundles or scattered singly, acerose fusiform-shaped, pits and pit canals visible or invisible. Testa cells pale yellow, cells of outer layer polygonal with slightly thickened walls; cells of inner layer with papillae. Xylem parenchymatous cells subrectangular with pits. Cotyledon cells containing aleurone grains and oil droplets. (Fig 1)



图1 苍耳子（*Xanthium sibiricum* 带总苞的果实）粉末

[Fig1 Powder of fruit with involucre from *Xanthium sibiricum*]

1. 果皮表皮（Pericarp epidermis） 2. 总苞纤维（Fibres of involucrum） 3. 果皮纤维（Fibres of pericarp） 4. 种皮[Testa（a. 种皮外层Outer layer of testa b. 种皮内层Inner layer of testa）] 5. 木薄壁细胞（Xylem parenchymatous cells） 6. 子叶细胞（Cotyledon cells）

芡　　实

Qianshi

SEMEN EURYALES

本品为睡莲科植物芡*Euryale ferox* Salisb. 的干燥成熟种仁。

[显微特征] 本品粉末：类白色，主为淀粉粒，单粒类圆形，直径1～4μm，大粒脐点隐约可见；复粒多数由百余分粒组成，类球形，直径13～35μm，少数由2～3分粒组成。（图1）

Powder: Whitish. Mainly consisting of starch granules. Simple granules subrounded, 1 ~ 4 μm in diameter, hilum of large granules indistinctly visible; compound granules mostly consisting of more than one hundred components, subspherical, 13 ~ 35 μm in diameter, a few consisting of 2 ~ 3 components. (Fig 1)

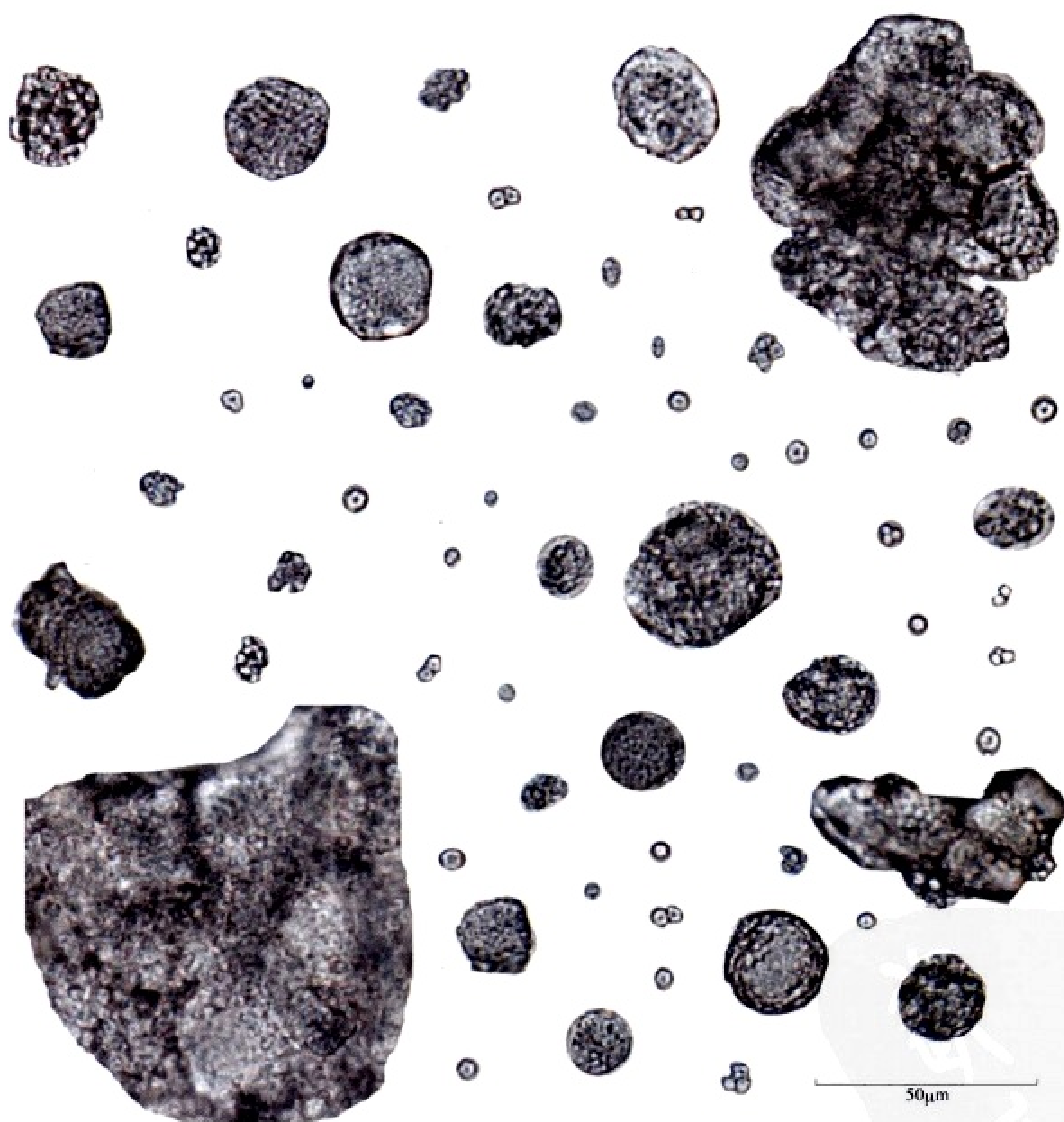


图1　芡实（*Euryale ferox* 种仁）粉末

[Fig1　Powder of kernel from *Euryale ferox*]

苏　木

Sumu

LIGNUM SAPPAN

本品为豆科植物苏木*Caesalpinia sappan* L. 的干燥心材。

[显微特征] 本品横切面：射线宽1～2列细胞。导管直径约至160μm，常含黄棕色或红棕色物。木纤维多角形，壁极厚。木薄壁细胞壁厚，木化，有的含草酸钙方晶。髓部薄壁细胞不规则多角形，大小不一，壁微木化，具纹孔。（图1）

Transverse section: Rays 1 ~ 2 cells wide. Vessels up to about 160 μm in diameter, usually containing yellowish-brown or reddish-brown contents. Xylary fibres mostly polygonal, with extremely thickened walls. Parenchymatous cells in xylem thick-walled and lignified, sometimes containing prisms of calcium oxalate. Parenchymatous cells in pith irregularly polygonal, varying in size, walls slightly lignified and pitted.（Fig 1）

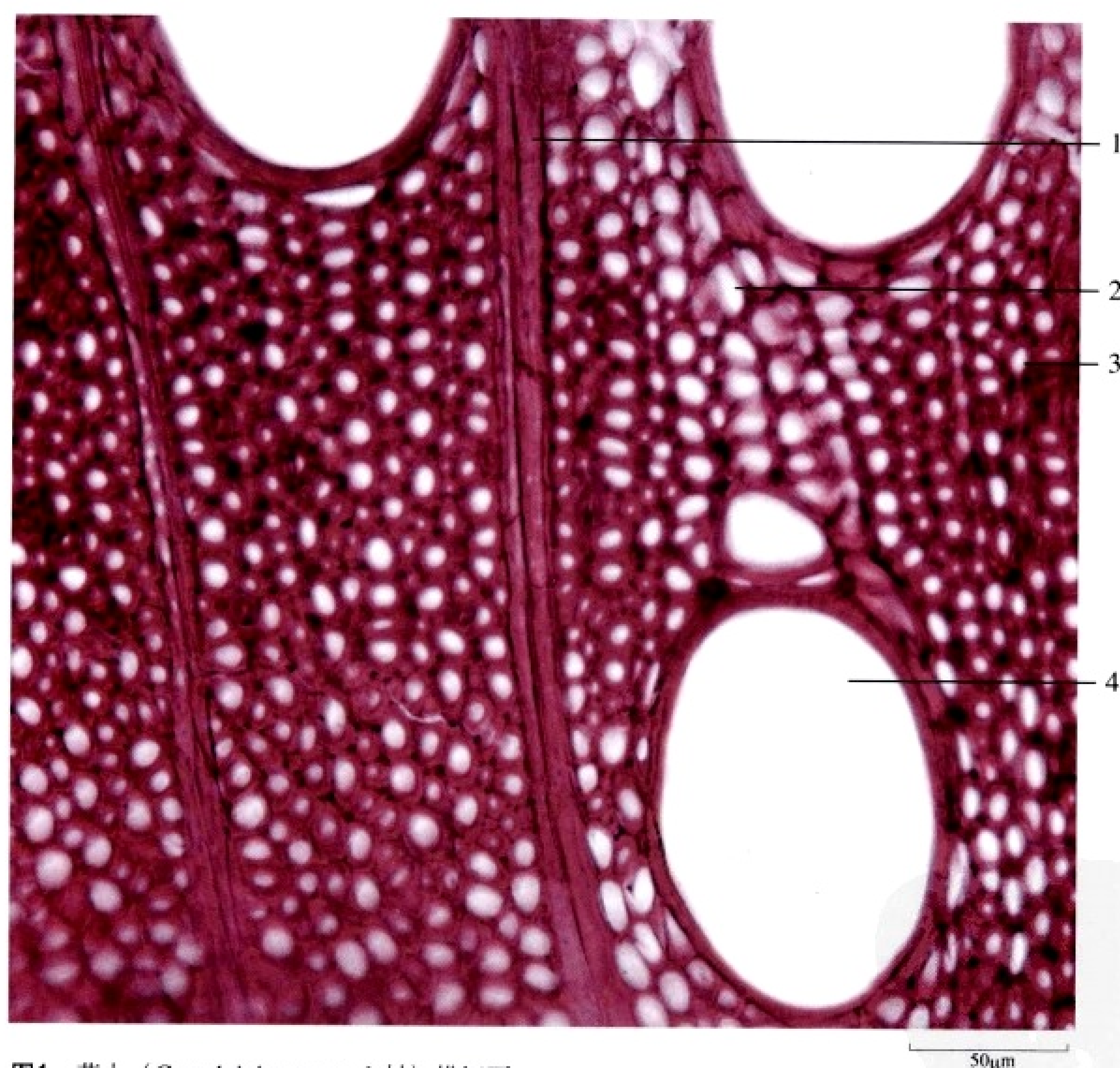


图1　苏木（*Caesalpinia sappan* 心材）横切面

[Fig1　Transverse section of heart wood from *Caesalpinia sappan*]

1. 木射线（Xylem rays）　2. 木薄壁细胞（Parenchymatous cells in xylem）　3. 木纤维（Xylem fibres）　4. 导管（Vessels）

杜　　仲

Duzhong

CORTEX EUCOMMIAE

本品为杜仲科植物杜仲*Eucommia ulmoides* Oliv. 的干燥树皮。

[显微特征] 本品粉末：棕色。橡胶丝成条或扭曲成团，表面显颗粒性。石细胞甚多，大多成群，类长方形、类圆形、长条形或形状不规则，长约至180μm，直径20～80μm，壁厚，有的胞腔内含橡胶团块。木栓细胞表面观多角形，直径15～40μm，壁不均匀增厚，木化，有细小纹孔；侧面观长方形，壁三面增厚，一面薄，孔沟明显。(图1)

Powder: Brown. Rubber threads stripe-shaped or twisted into masses, surface granular. Stone cells numerous, mostly in groups, subrectangular, subrounded, elongated-rectangular or irregular, 20 ~ 80μm in diameter, up to 180μm long, thick-walled, some containing rubber masses. Cork cells polygonal in surface view, 15～40μm in diameter, with unevenly thickened, lignified and finely pitted walls; rectangular in lateral view, walls thickened on three sides and relatively thin on one side, pit canals distinct.（Fig 1）

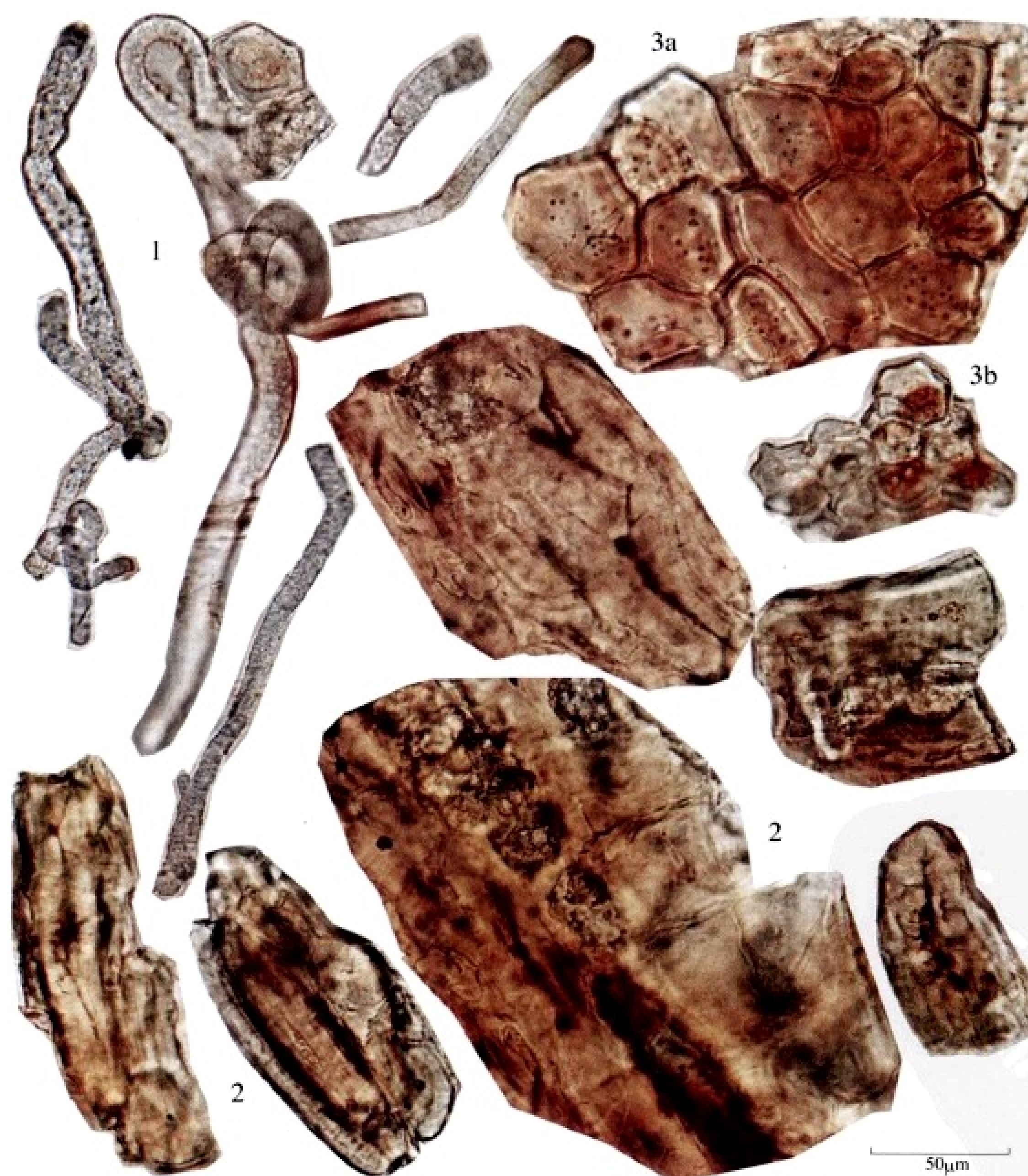


图1　杜仲（*Eucommia ulmoides* 树皮）粉末

[Fig1　Powder of stem bark from *Eucommia ulmoides*]

1. 橡胶丝（Rubber threads）　2. 石细胞及橡胶丝团块（Stone cells containing rubber masses）

3. 木栓细胞Cork cells（a. 表面观 Surface view　b. 侧面观 Lateral view）

两　头　尖

Liangtoujian

RHIZOMA ANEMONES RADDEANAE

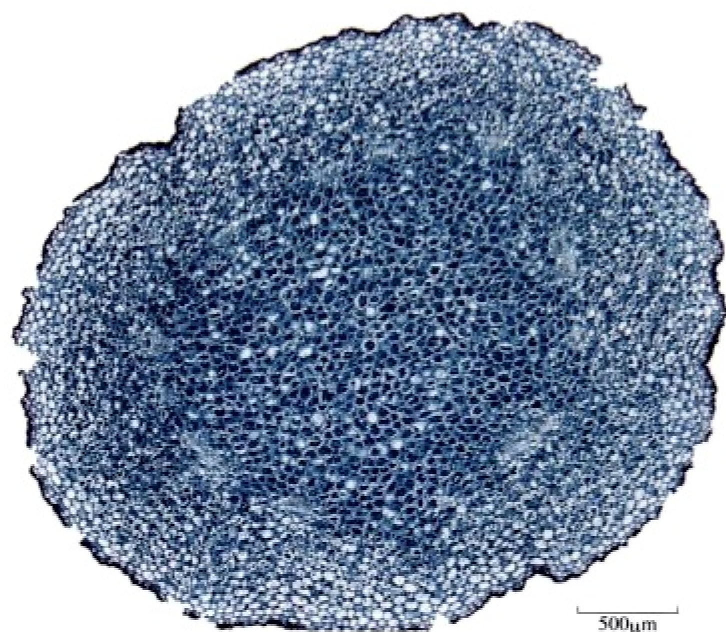


图1　两头尖（*Anemone raddeana* 根茎）横切面
[Fig1　Transverse section of rhizome from *Anemone raddeana*]

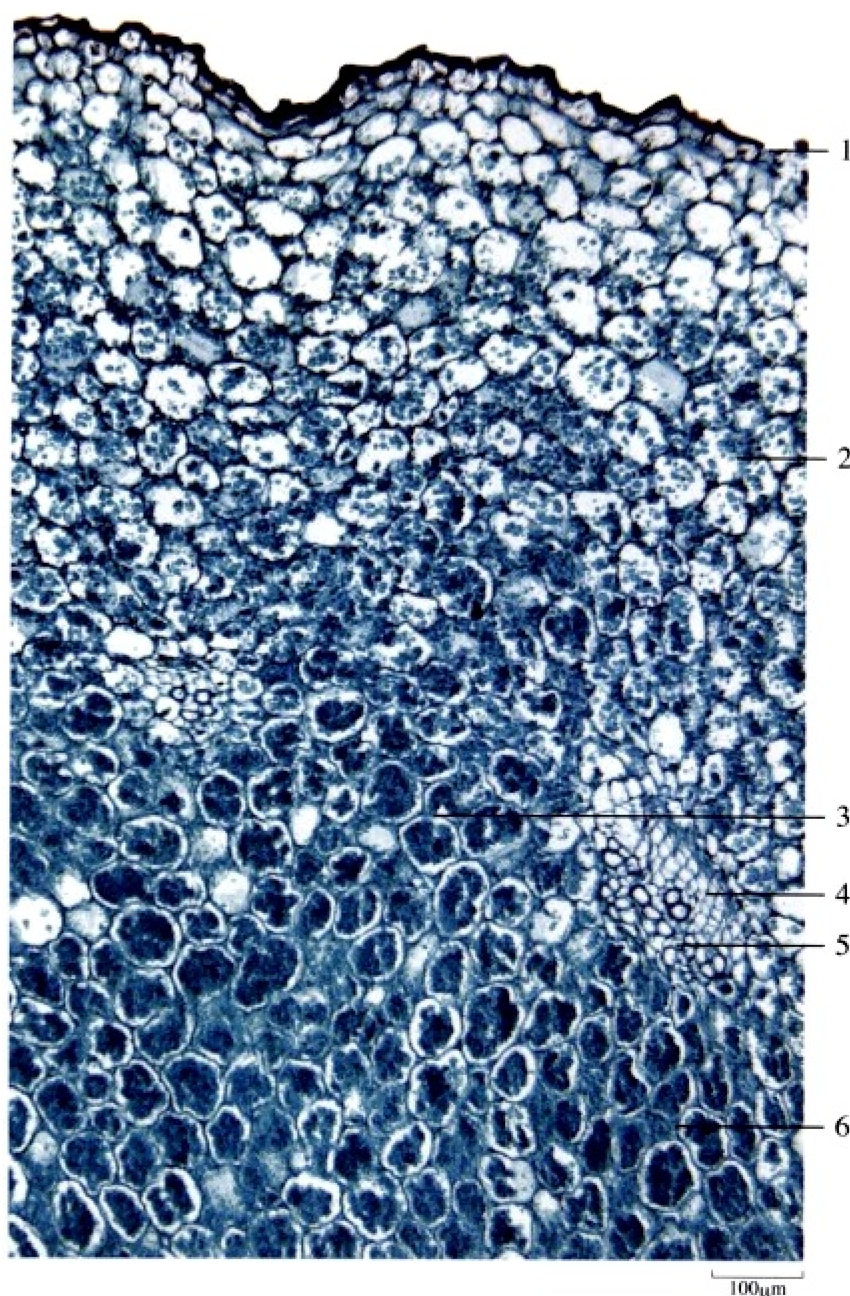


图2　局部组织放大
[Fig2　Partial tissue magnified]
1. 表皮（Epidermis）　2. 皮层（Cortex）　3. 射线（Rays）
4. 韧皮部（Phloem）　5. 木质部（Xylem）　6. 髓（Pith）

本品为毛茛科植物多被银莲花*Anemone raddeana* Regel 的干燥根茎。

[显微特征]　本品横切面：表皮细胞1列，切向延长，外壁增厚。皮层由10余列类圆形薄壁细胞组成。维管束外韧型，10余个排成环状，韧皮部细胞皱缩，木质部导管6～24个，形成层不明显。射线宽阔，髓部较大，为类圆形薄壁细胞组成。薄壁细胞充满淀粉粒。（图1、2）

Transverse section: Epidermis consisting of 1 layer of cells, tangentially elongated, outer walls thickened. Cortex of 10 or more layers of subrounded parenchymatous cells. Vascular bundles collateral, 10 or more ones arranged in a ring, phloem cells shrunken, xylem vessels 6 ~ 24, cambium indistinct. Rays broad, pith relatively large and composed of subrounded parenchymatous cells. Parenchymatous cells filled with starch granules.（Fig 1,2）

本品粉末：灰褐色。淀粉粒众多，单粒类圆形或椭圆形，直径2～11μm，脐点点状或短缝状，层纹不明显；复粒由2～4分粒组成。表皮细胞红棕色、黄色或亮黄色，外壁木栓化增厚，常呈脊状或瘤状突入细胞内。网纹导管、螺纹导管或梯纹导管多见，直径10～33μm，少有具缘纹孔导管。（图3）

Powder: Greyish-brown. Starch granules numerous, simple granules subrounded or elliptical, 2～11μm in diameter, hilum pointed or shortly cleft-like, striations indistinct; compound granules of 2～4 components. Epidermal cells reddish-brown, yellow or bright yellow, the outer walls suberized and thickened, frequently protruding into the cells to be ridge-like or tubercular. Reticular, spiral or scalariform vessels frequent, 10～33μm in diameter, some with bordered pitted vessels. (Fig 3)

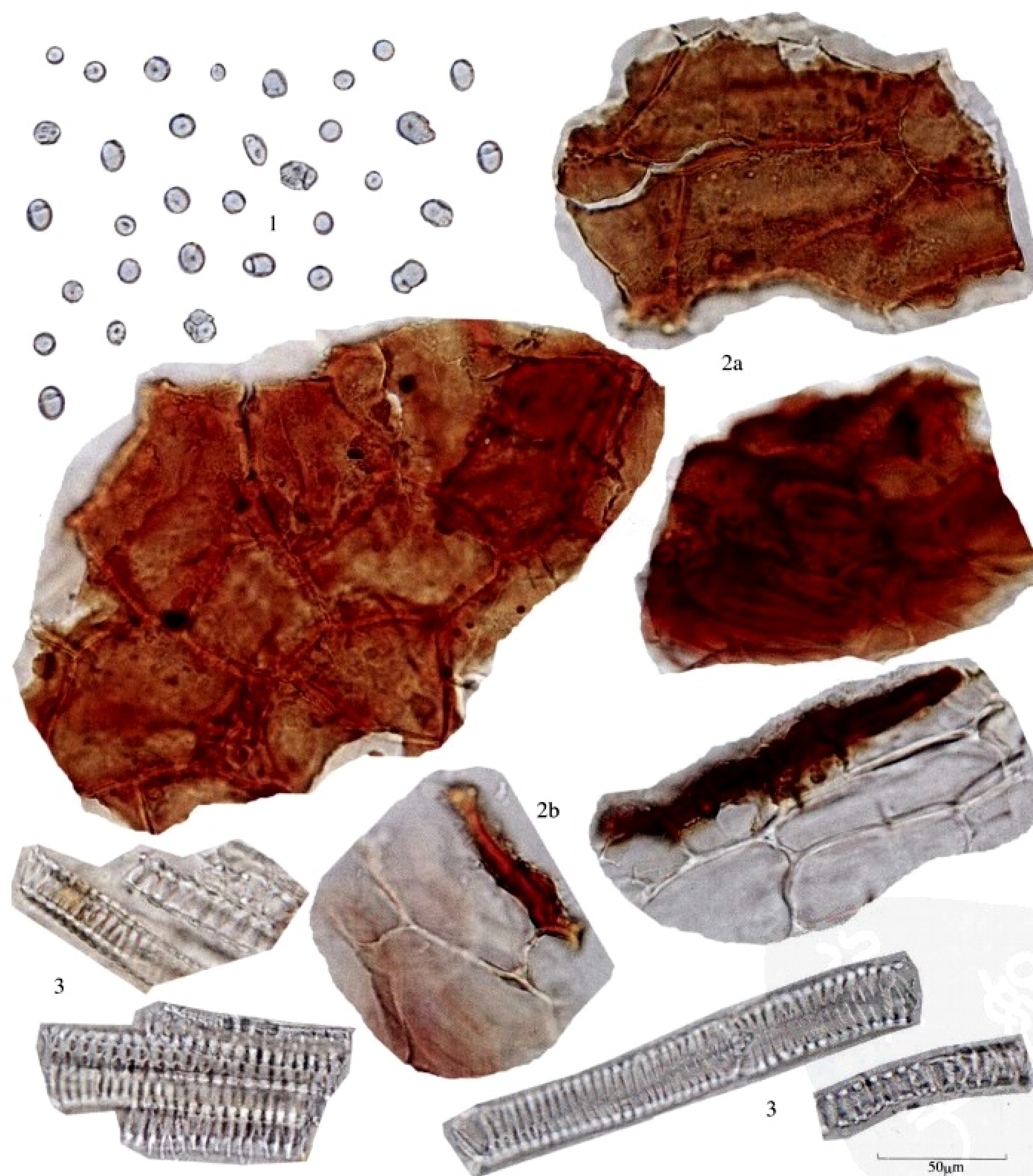


图3 两头尖（*Anemone raddeana* 根茎）粉末

[Fig3 Powder of rhizome from *Anemone raddeana*]

1. 淀粉粒（Starch granules） 2. 表皮细胞[Epidermal cells（a. 表面观Surface view b. 侧面观Lateral view）] 3. 导管（Vessels）

两 面 针

Liangmianzhen

RADIX ZANTHOXYLI

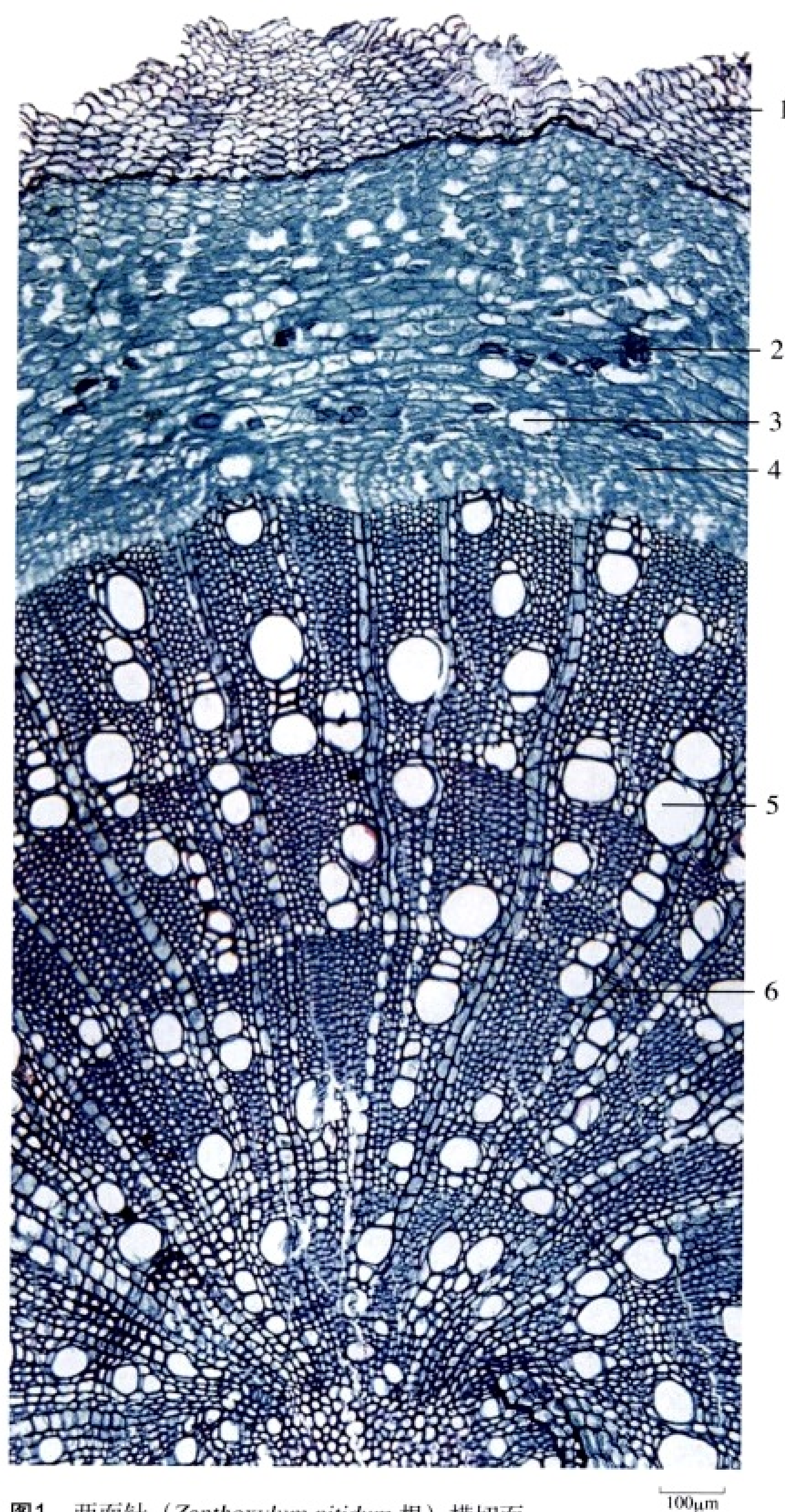


图1　两面针（*Zanthoxylum nitidum* 根）横切面

[Fig1　Transverse section of root from *Zanthoxylum nitidum*]

1. 木栓层（Cork）　2. 纤维（Fibres）　3. 油细胞（Oil cell）

4. 韧皮部（Phloem）　5. 木质部（Xylem）　6. 射线（Ray）

本品为芸香科植物两面针*Zanthoxylum nitidum*（Roxb.）DC. 的干燥根。

[显微特征] 本品横切面：木栓层为10～15列木栓细胞。韧皮部有少数草酸钙方晶及油细胞散在，油细胞长径52～122μm，短径28～87μm；韧皮部外缘有木化的纤维，单个或2～5个成群。木质部导管35～98μm，周围有纤维束；木射线宽1～3列细胞，有单纹孔。薄壁细胞充满淀粉粒。（图1、2）

Transverse section: Cork consisting 10～15 rows of cells. Phloem scattered with a few prisms of calcium oxalate and oil cells, oil cells 52～122μm in long diameter, 28～87μm in short diameter; the outside of phloem showing some lignified fibres, single or 2～5 in groups. In xylem vessels 35～98μm in diameter, surrounded by fibre bundles; woody rays 1～3 rows of cells in width, with simple pits. Parenchymatous cells packed with starch granules.（Fig 1, 2）

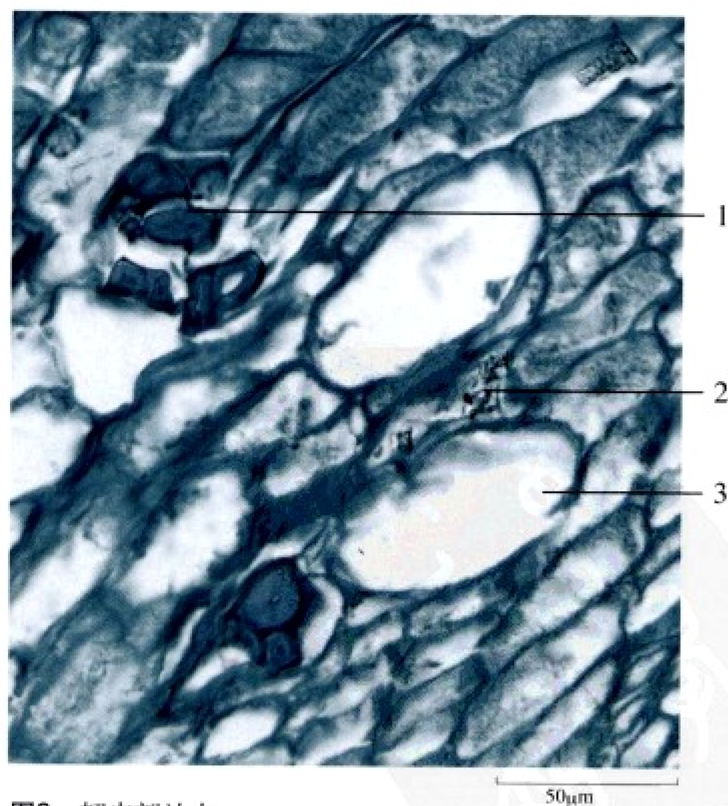


图2　韧皮部放大

[Fig2　Phloem magnified]

1. 纤维（Fibres）　2. 草酸钙方晶（Prisms of calcium oxalate）

3. 油细胞（Oil cells）

连 钱 草
Lianqiancao
HERBA GLECHOMAE

本品为唇形科植物活血丹*Glechoma longituba*（Nakai）Kupr. 的干燥地上部分。

[显微特征] 本品粉末：灰绿色。非腺毛多细胞，常有一至几个细胞缢缩，另有单细胞锥状非腺毛。腺鳞头部8细胞。小腺毛头部单细胞；柄单细胞。叶下表皮细胞垂周壁波状弯曲,气孔直轴式；上表皮细胞垂周壁微波状弯曲，有较细密的角质纹理。螺纹导管、网纹导管直径20～30μm。（图1）

Powder: Greyish-green. Non-glandular hairs multicellular, 1 to several cells frequently shrunken, and some non-glandular hairs unicellular and conical. Glandular scales each with a head of 8 cells. Small glandular hairs each with an unicellular head and an unicellular stalk. The lower epidermal cell walls of leaf sinuous, stomata diacytic. The anticlinal walls of upper epidermal cells of leaf slightly sinuous, with relatively fine and dense cuticular striations. Spiral vessels and reticulate vessels 20～30μm in diameter.（Fig 1）



图1 连钱草（*Glechoma longituba* 地上部分）粉末

[Fig1 Powder of the aerial part from *Glechoma longituba*]

1. 非腺毛（Non-glandular hairs） 2. 腺鳞（Glandular scales） 3. 小腺毛（Small glandular hairs）
4. 叶下表皮细胞（Lower epidermal cells of leaf） 5. 叶上表皮细胞（Upper epidermal cells of leaf） 6. 导管（Vessels）

连　翘
Lianqiao
FRUCTUS FORSYTHIAE

本品为木犀科植物连翘*Forsythia suspensa*（Thunb.）Vahl的干燥果实。

[显微特征]　本品果皮横切面：外果皮为1列扁平细胞，外壁及侧壁增厚，被角质层。中果皮外侧薄壁组织中散有维管束；中果皮内侧为多列石细胞，长条形、类圆形或长圆形，壁厚薄不一，多切向镶嵌状排列。内果皮为1列薄壁细胞。（图1）

Transverse section of pericarp: Exocarp consisting of 1 row of epidermal cells, with thickened outer and lateral walls and covered with cuticle. Mesocarp composed of vascular bundles scattered in parenchyma at the out side, and many layers of stone cells at the inner side; stone cells elongated, subrounded or oblong, with walls varying in thickness, mostly tangentially arranged in parquet form. Endocarp consisting of 1 layer of parenchymatous cells.（Fig 1）

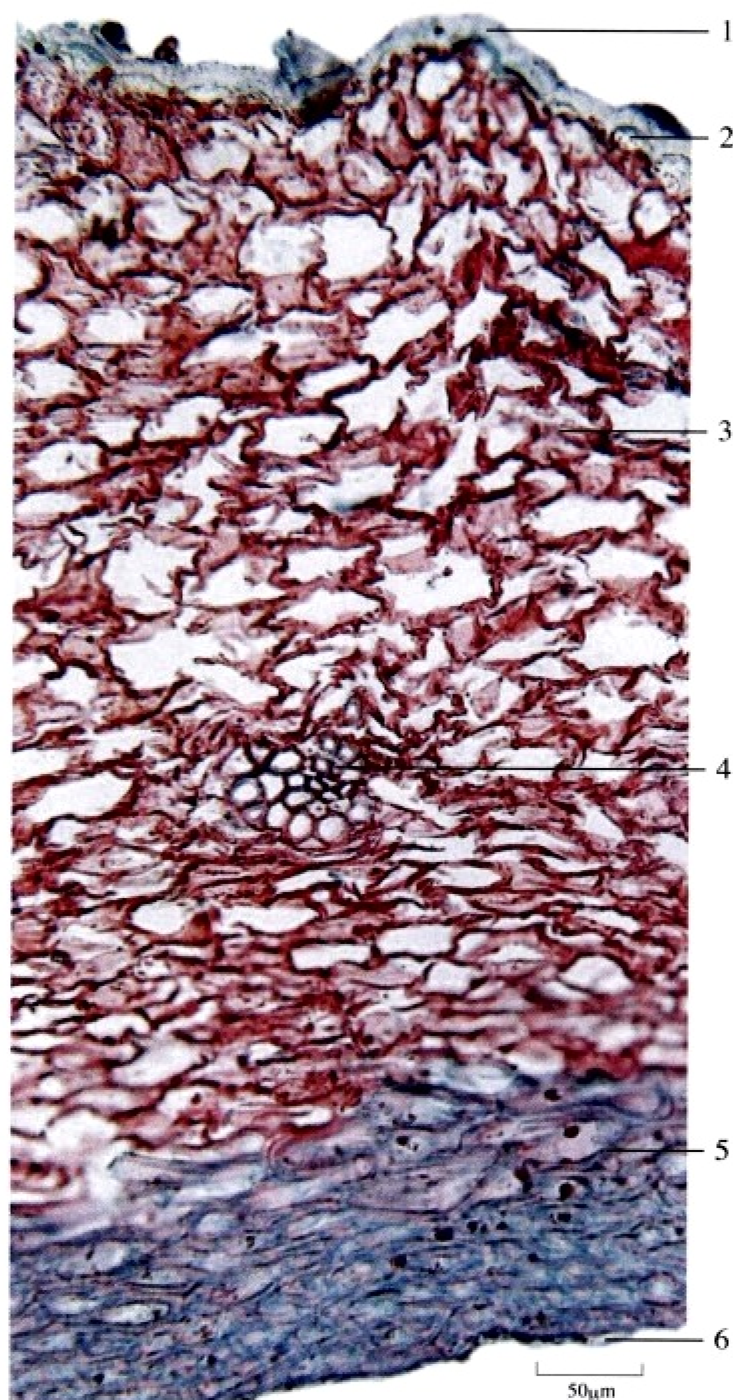


图1　连翘（*Forsythia suspensa* 果皮）横切面

[Fig1　Transverse section of pericarp from *Forsythia suspensa*]

1. 角质层（Cuticle layer）　2. 外果皮细胞（Exocarp cells）　3. 中果皮薄壁细胞（Mesocarp parenchymatous cells）　4. 维管束（Vascular bundles）　5. 中果皮石细胞（Mesocarp stone cells）　6. 内果皮（Endocarp）

吴 茱 萸

Wuzhuyu

FRUCTUS EVODIAE

本品为芸香科植物吴茱萸*Evodia rutaecarpa*（Juss.）Benth.、石虎*Evodia rutaecarpa*（Juss.）Benth. var. *officinalis*（Dode）Huang或疏毛吴茱萸*Evodia rutaecarpa*（Juss.）Benth. var. *bodinieri*（Dode）Huang的干燥近成熟果实。

[显微特征]　本品粉末：褐色。非腺毛2～6细胞，长140～350μm，壁疣明显，有的胞腔内含棕黄色至棕红色物。腺毛头部7～14细胞，椭圆形，常含黄棕色内含物；柄2～5细胞。草酸钙簇晶较多，直径10～25μm；偶有方晶。石细胞类圆形或长方形，直径35～70μm，胞腔大。油室碎片有时可见，淡黄色。（图1）

Powder: Brown. Non-glandular hairs 2～6 celled, 140～350 μm long, walls with obvious warts, some lumina containing brownish-yellow to brownish-red contents. Glandular hairs each with a 7～14 celled head, elliptical, usually containing yellowish-brown contents, and a 2～5 celled stalk. Clusters of calcium oxalate frequently found, 10～25 μm in diameter; prisms occasional found. Stone cells subrounded or rectangular, 35～70 μm in diameter, with large lumina. Pale yellow fragments of oil cavities sometimes visible.（Fig 1）



图1　吴茱萸（*Evodia rutaecarpa* 近成熟果实）粉末

[Fig1　Powder of nearly ripe fruit from *Evodia rutaecarpa*]

1. 非腺毛（Non-glandular hairs）　2. 腺毛（Glandular hairs）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 石细胞（Stone cells）　5. 油室碎片（Fragments of oil cavities）

牡　丹　皮

Mudanpi

CORTEX MOUTAN

本品为毛茛科植物牡丹*Paeonia suffruticosa* Andr. 的干燥根皮。

[显微特征]　**本品粉末**：淡红棕色。淀粉粒甚多，单粒类圆形或多角形，直径3～16μm，脐点点状、裂缝状或飞鸟状；复粒由2～6分粒组成。草酸钙簇晶直径9～45μm，有时含晶细胞连接，簇晶排列成行，或一个细胞含数个簇晶。木栓细胞长方形，壁稍厚，浅红色。（图1）

Powder: Pale reddish-brown. Starch granules fairly abundant, simple granules subrounded or polygonal, 3～16 μm in diameter, hilum pointed, cleft or V-shaped, compound granules of 2～6 components. Clusters of calcium oxalate 9～45 μm in diameter, sometimes crystal-containing cells jointed each other, clusters arranged in rows or several clusters in one cell. Cork cells rectangular, slightly thick-walled, pale red. （Fig 1）

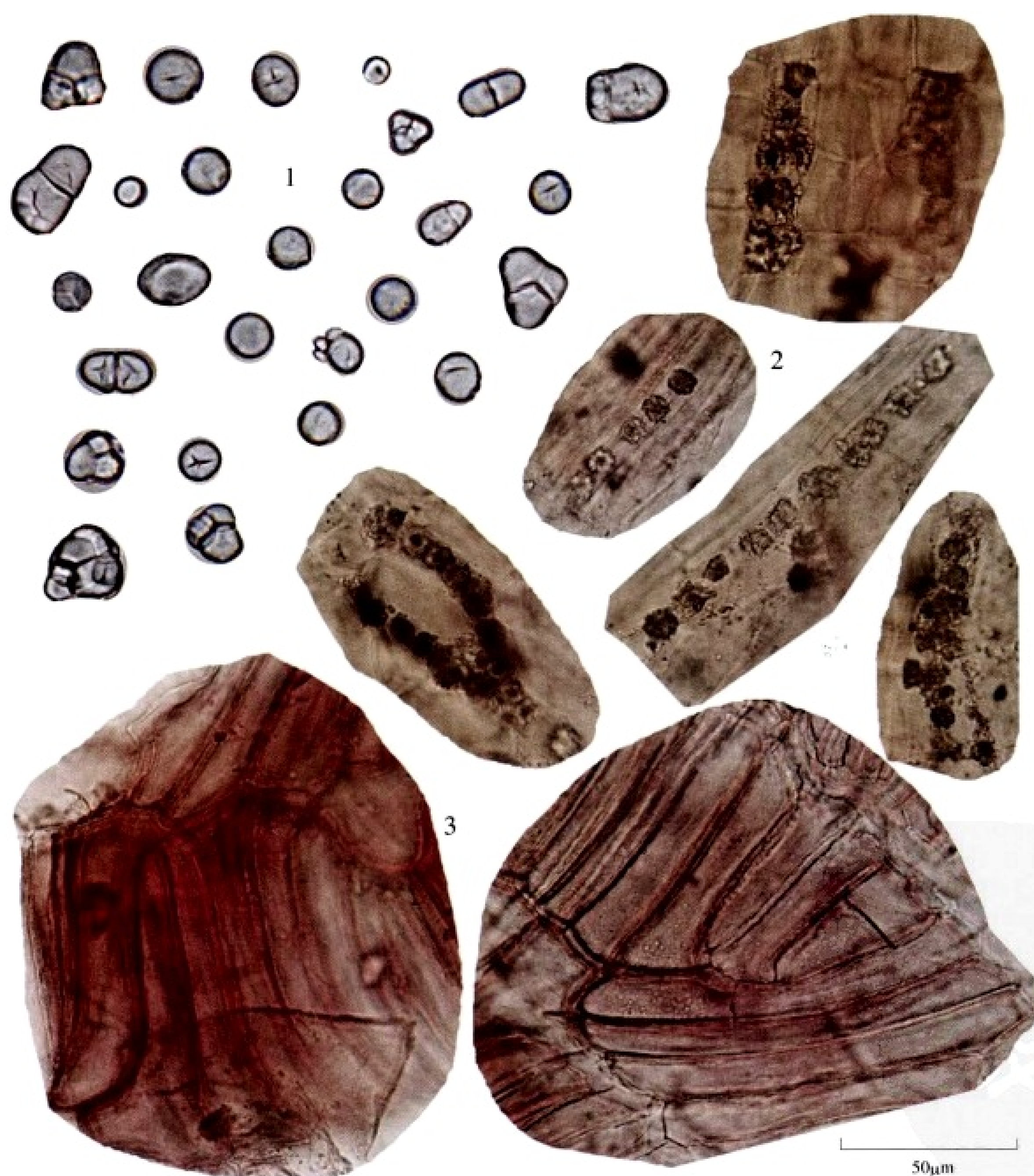


图1　牡丹皮（*Paeonia suffruticosa* 根皮）粉末

[Fig1　Powder of root bark from *Paeonia suffruticosa*]

1.淀粉粒（Starch granules）2.草酸钙簇晶（Clusters of calcium oxalate）3.木栓细胞（Cork cells）

牡 荆 叶

Mujingye

FOLIUM VITICIS NEGUNDO

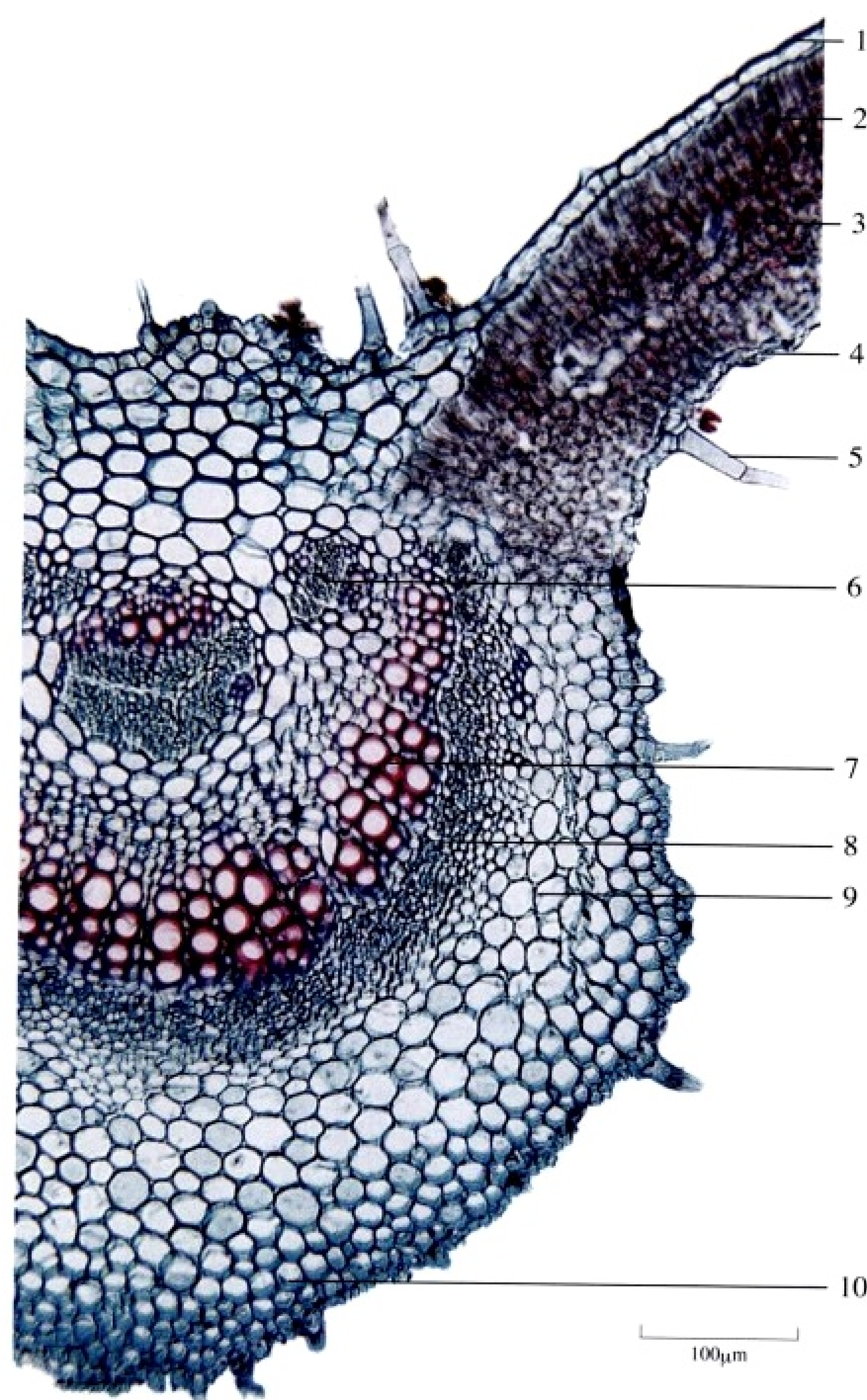


图1 牡荆叶（*Vitex negundo* var. *cannabifolia* 新鲜叶）横切面

[Fig1 Transverse section of fresh leaf from *Vitex negundo* var. *cannabifolia*]

1.上表皮细胞（Upper epidermal cells） 2.栅栏组织（Palisade tissue） 3.海绵组织（Spongy tissue） 4.下表皮细胞（Lower epidermal cells） 5.毛茸（pubescence） 6.小维管束（Small vascular bundles） 7.主脉维管束木质部（Xylem of vascular bundles of midrib） 8.主脉维管束韧皮部（Phloem of vascular bundles of midrib） 9.薄壁细胞（Parenchymatous cells） 10.厚角细胞（Collenchmatous cells）

本品为马鞭草科植物牡荆*Vitex negundo* L. var. *cannabifolia* （Sieb. et Zucc.） Hand. –Mazz. 的新鲜叶。

[显微特征]　本品横切面：上表皮细胞排列较整齐，上、下表面均有毛茸，下表面毛茸较多。叶肉栅栏组织为3～4列细胞，海绵组织较疏松。主脉维管束外韧型，呈月牙形或“U”字形，“U”形的凹部另有1～5个较小的维管束；周围薄壁细胞可见纹孔；上、下表皮内方有数列厚角细胞。（图1）

Transverse section: Upper epidermal cells arranged regularly, pubescent on both surfaces and more prominent on the lower surface. Palisade tissue of 3～4 layers of cells; spongy tissue loose. Vascular bundles of midrib collateral, U-shaped, with 1～5 small vascular bundles in the hollow of U-shaped part; pits visible on surrounding parenchymatous cells; several layers of collenchmatous cells occurring inside the upper epidermis and lower epidermis. （Fig 1）

本品表面观：上表皮细胞呈类多角形或不规则形，垂周壁波状弯曲；非腺毛1～4细胞，先端细胞较长，表面有疣状突起；腺鳞头部4细胞，直径约至55μm，柄单细胞；小腺毛少见，头部1～4细胞，直径约至25μm，柄1～3细胞，甚短。下表皮细胞较小，长17～30（45）μm，直径12～25μm，垂周壁微弯曲或较平直；气孔不定式，直径15～20μm，副卫细胞3～6个；非腺毛、腺鳞和小腺毛较多。（图2）

Surface view of leaf: Upper epidermal cells subpolygonal or irregular, with sinuous anticlinal walls. Non-glandular hairs 1～4-celled, apical cells elongated, with warty prominences. Glandular scales each with a 4-celled head up to 55 μm in diameter, and an unicellular stalk. Small glandular hairs few, each with a 1～4-celled head up to 25 μm in diameter, and a very short 1～3-celled stalk. Lower epidermal cells relatively small, 17～30 (45) μm long, 12～25 μm in diameter, with slightly sinuous or straight anticlinal walls; stomata anomocytic, 15～20 μm in diameter, with 3～6 subsidiary cells. Non-glandular hairs, glandular scales and small glandular hairs numerous. (Fig 2)



图2 牡荆叶（*Vitex negundo* var. *cannabifolia* 新鲜叶）表面观

[Fig2 Surface view of fresh leaf from *Vitex negundo* var. *cannabifolia*]

1. 上表皮细胞（Upper epidermal cells） 2. 非腺毛（Non-glandular hairs） 3. 腺鳞（Glandular scales） 4. 小腺毛（Small glandular hairs） 5.下表皮细胞（Lower epidermal cells）

何　首　乌
Heshouwu
RADIX POLYGONI MULTIFLORI

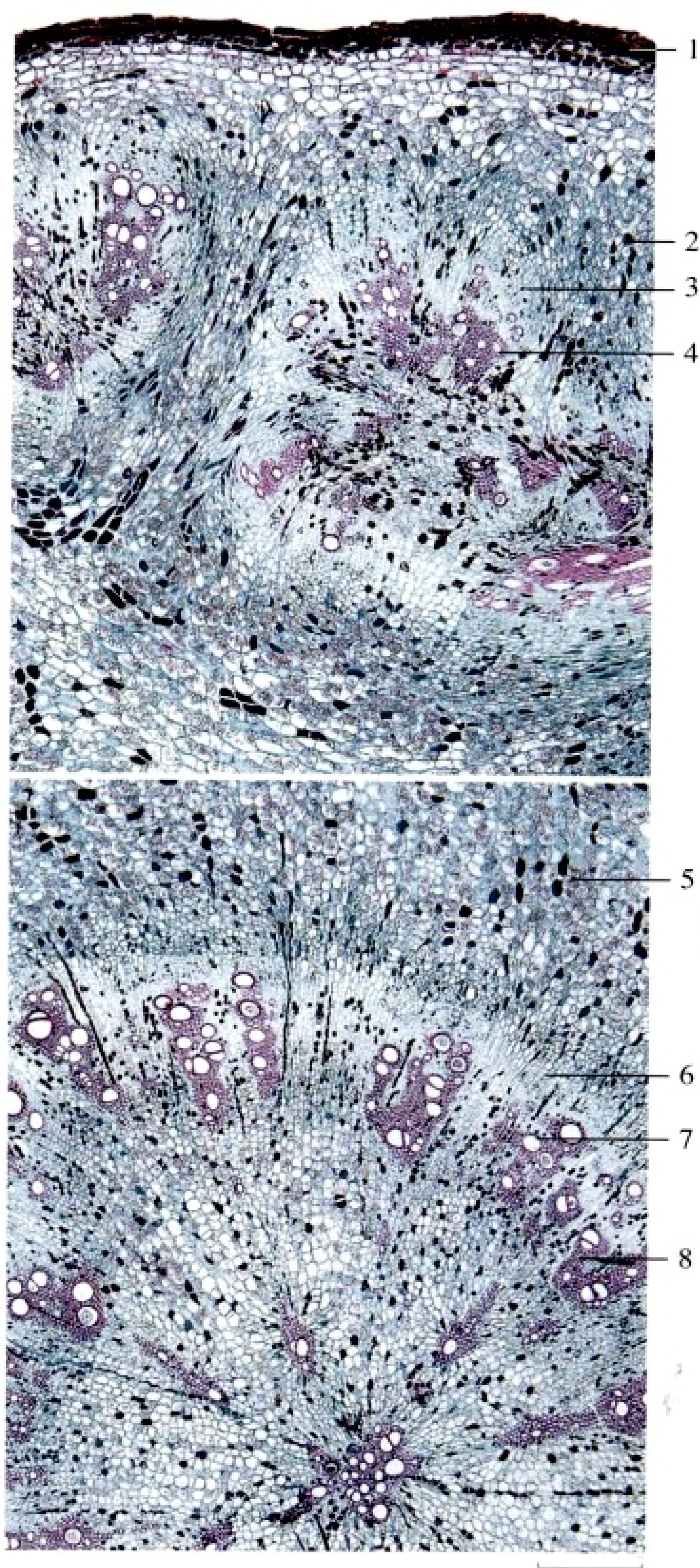


图2　何首乌（*Polygonum multiflorum* 块根）横切面
[Fig2　Transverse section of root from *Polygonum multiflorum*]
1. 木栓层（Cork）　2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 异型维管束[Abnormal vascular bundles （韧皮部phloem）]　4. 异型维管束[Abnormal vascular bundles（木质部xylem）]　5. 韧皮部（Phloem）　6.形成层（Cambium）　7. 木质部（Xylem）　8.木纤维（Xylem fibres）

本品为蓼科植物何首乌*Polygonum multiflorum* Thunb. 的干燥块根。

[显微特征]　**本品横切面**：木栓层为数列细胞，充满棕色物。韧皮部较宽，散有类圆形异型维管束4～11个，为外韧型，导管稀少。根的中央形成层成环；木质部导管较少，周围有管胞及少数木纤维。薄壁细胞含草酸钙簇晶及淀粉粒。（图1、2）

Transverse section: Cork consisting of several layers of cells, filled with brown contents. Phloem relatively broad, scattered with 4 ~ 11 subrounded abnormal vascular bundles of collateral type, vessels rare. In the central part cambium in a ring; vessels in xylem less, surrounded by some tracheids and a few xylem fibres. Parenchymatous cells containing starch granules and clusters of calcium oxalate. （Fig 1, 2）

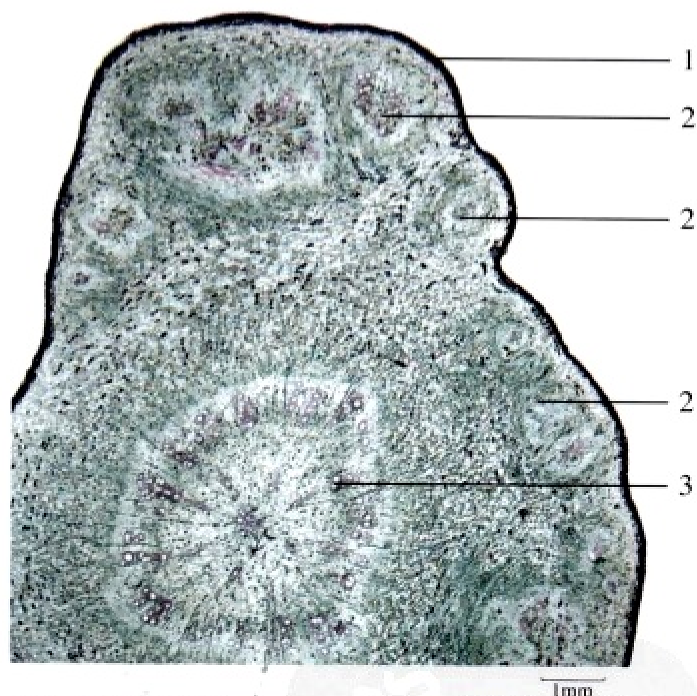


图1　何首乌（*Polygonum multiflorum* 块根）组织图
[Fig1　Transverse section（general）of root from *Polygonum multiflorum*]
1. 木栓层（Cork）　2. 异型维管束（Abnormal vascular bundles）　3. 中央维管束（Vascular bundles）

本品粉末：黄棕色。淀粉粒单粒类圆形，直径4～50μm，脐点人字形、星状或三叉状，大粒者隐约可见层纹；复粒由2～9分粒组成。草酸钙簇晶直径10～80 （160） μm，偶见簇晶与较大的方形结晶合生。棕色细胞类圆形或椭圆形，壁稍厚，胞腔内充满淡黄棕色、棕色或红棕色物质，并含淀粉粒。具缘纹孔导管直径17～178μm。棕色块散在，形状、大小及颜色深浅不一。(图3)

Powder: Yellowish-brown. Simple starch granules subrounded, 4 ~ 50 μm in diameter, hilum V-shaped, stellate or Y-shaped, striations of large ones fairly distinct; compound granules of 2~9 components. Clusters of calcium oxalate 10~80 （160） μm in diameter, and clusters jointed with prisms occasionally found. Brown cells subrounded or elliptical, walls slightly thickened, lumina filled with yellowish-brown, brown or reddish-brown contents, and containing starch granules; bordered pitted vessels 17 ~178μm in diameter. Brown masses scattered, varying in shape, size and colour. （Fig 3）

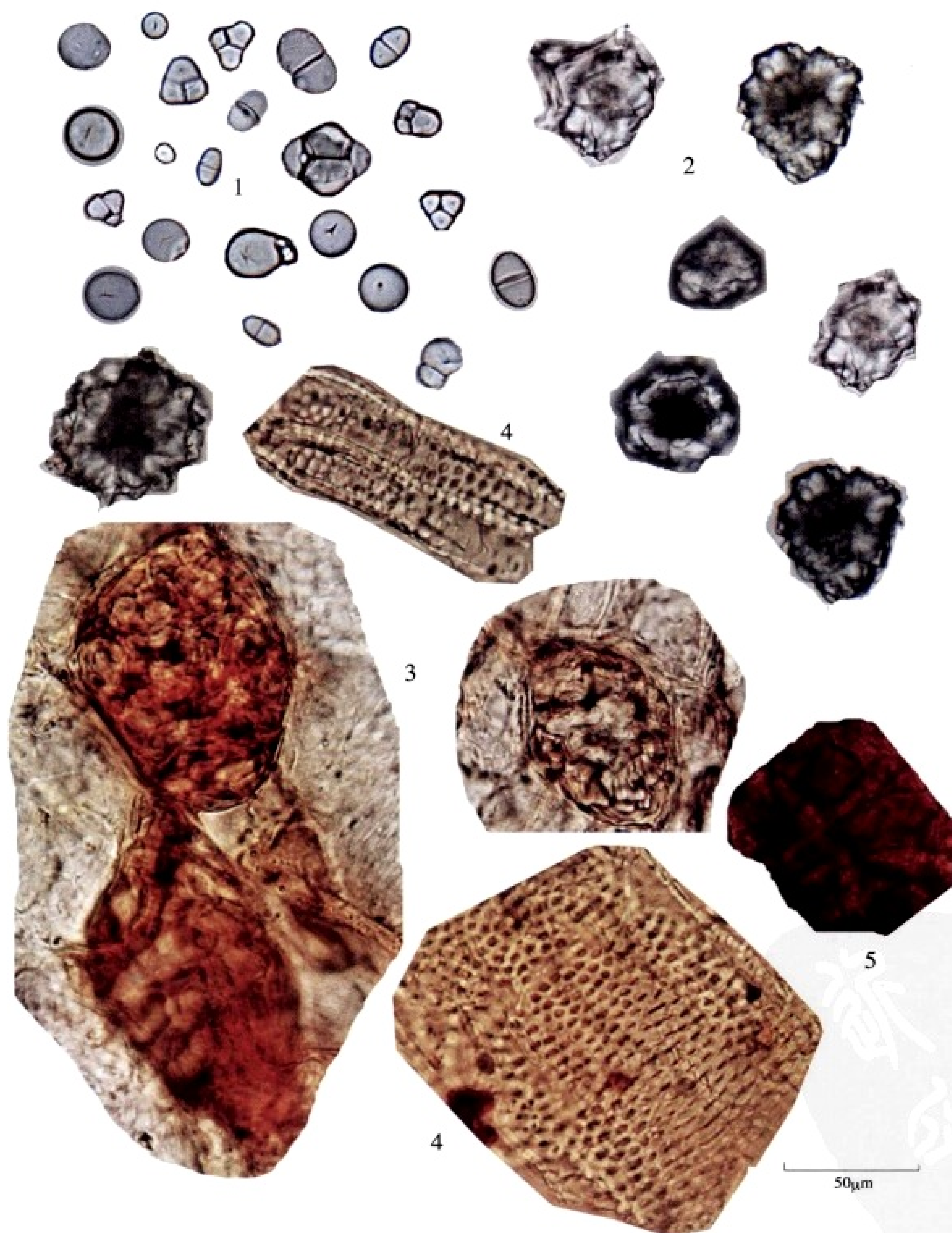


图3 何首乌 （*Polygonum multiflorum* 块根） 粉末

[Fig 3 Powder of root from *Polygonum multiflorum*]

1. 淀粉粒（Starch granules） 2. 草酸钙簇晶（Clusters of calcium oxalate） 3. 棕色细胞（Brown cells） 4. 导管（Vessels） 5. 棕色块（Brown masses）

伸　筋　草

Shenjincao

HERBA LYCOPODII

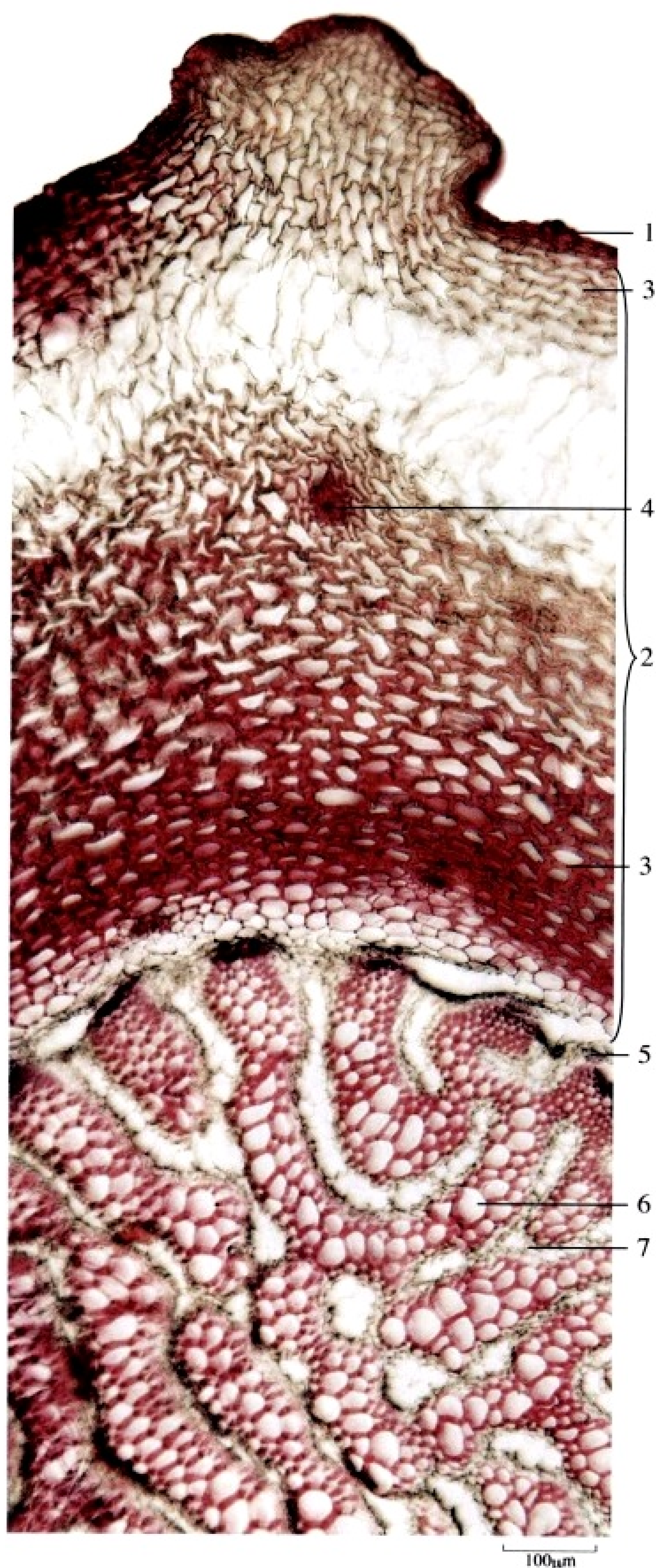


图1　伸筋草（*Lycopodium japonicum* 茎）横切面

[Fig 1　Transverse section of stem from *Lycopodium japonicum*]

1. 表皮（Epidermis）　2. 皮层（Cortex）　3. 厚壁细胞（Sclerenchymatous cells）　4. 叶迹维管束（Leaf trace vascular bundles）　5. 中柱鞘（Pericycle）　6. 木质部（Xylem）　7. 韧皮部（Phloem）

本品为石松科植物石松*Lycopodium japonicum* Thunb. 的干燥全草。

[显微特征]　本品茎横切面：表皮细胞1列。皮层宽广，有叶迹维管束散在，表皮下方和中柱外侧各有10～20余列厚壁细胞，其间有3～5列细胞壁略增厚；内皮层不明显。中柱鞘为数列薄壁细胞，木质部束呈不规则的带状或分枝状，韧皮部束交错其间，有的细胞含黄棕色物。(图1)

Transverse section of stem: Epidermal cells 1 layer. Cortex broad, scattered with leaf trace bundles, occurring 10～20 or more layers of sclerenchymatous cells below the epidermis and outside the stele respectively, and 3～5 layers of parenchymatous cells with slightly thickened walls between them; endodermis indistinct. Pericycle consisting of several layers of parenchymatous cells, bundles of xylem irregularly stripe-shaped or branched, intermingled with bundles of phloem, some cells containing yellowish-brown contents.（Fig 1）

皂　角　刺

Zaojiaoci

SPINA GLEDITSIAE

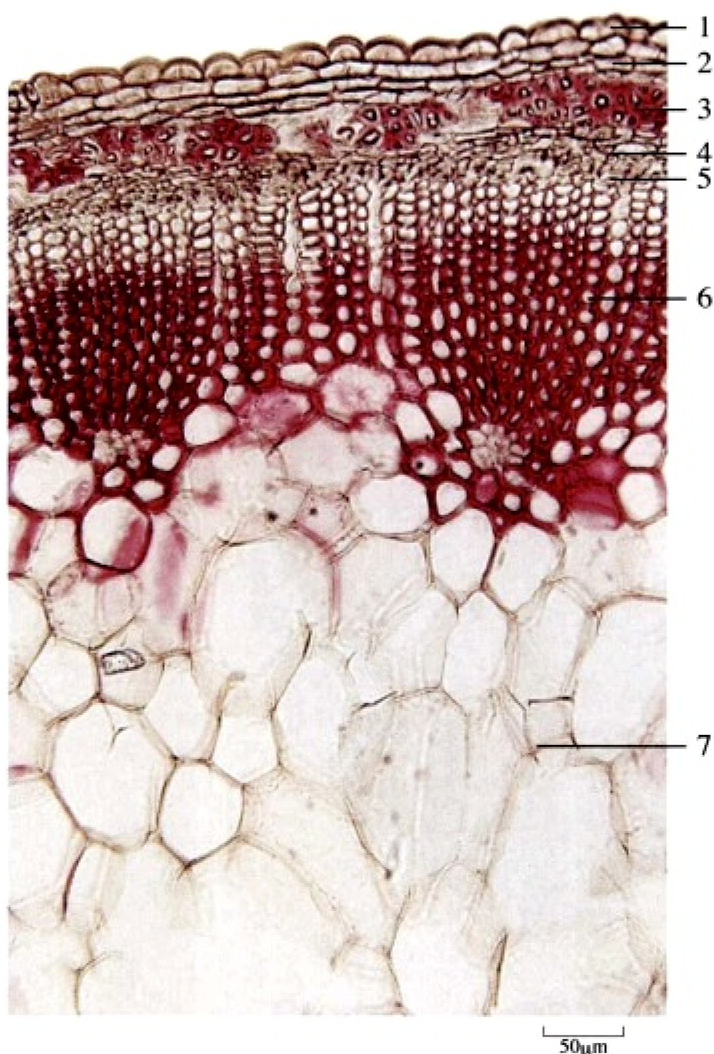


图1　皂角刺（*Gleditsia sinensis* 棘刺）横切面

[Fig1　Transverse section of spine from *Gleditsia sinensis*]

1. 表皮（Epidermis）　2. 皮层（Cortex）　3. 中柱鞘纤维束（Pericycle fibre bundles）　4. 韧皮部（Phloem）　5. 形成层（Cambium）　6. 木质部（Xylem）　7. 髓（Pith）

本品为豆科植物皂荚*Gleditsia sinensis* Lam. 的干燥棘刺。

[显微特征]　本品横切面：表皮细胞1列，外被角质层，有时可见单细胞非腺毛。皮层为2～3列薄壁细胞，细胞中有的含棕红色物。中柱鞘纤维束断续排列成环，纤维束周围的细胞有的含草酸钙方晶，偶见簇晶，纤维束旁常有单个或2～3个相聚的石细胞，壁薄。韧皮部狭窄。形成层成环。木质部连接成环，木射线宽1～2列细胞。髓部宽广，薄壁细胞含少量淀粉粒。（图1、2）

Transverse section: Epidermis consisting of 1 layer of cells covered with cuticle, sometimes unicellular non-glandular hairs found. Cortex consisting of 2～3 layers of parenchymatous cells, someone containing brownish-red substances. Pericycle fibre bundles in a discontinuous ring, surrounded by cells containing prisms of calcium oxalate or rarely clusters, usually accompanied with single or 2～3 grouped stone cells with thin walls. Phloem narrow. Cambium ring distinct. Xylem in ring, xylary rays 1～2 cells wide. Pith wide, parenchymatous cells containing a few of starch granules. (Fig 1, 2)

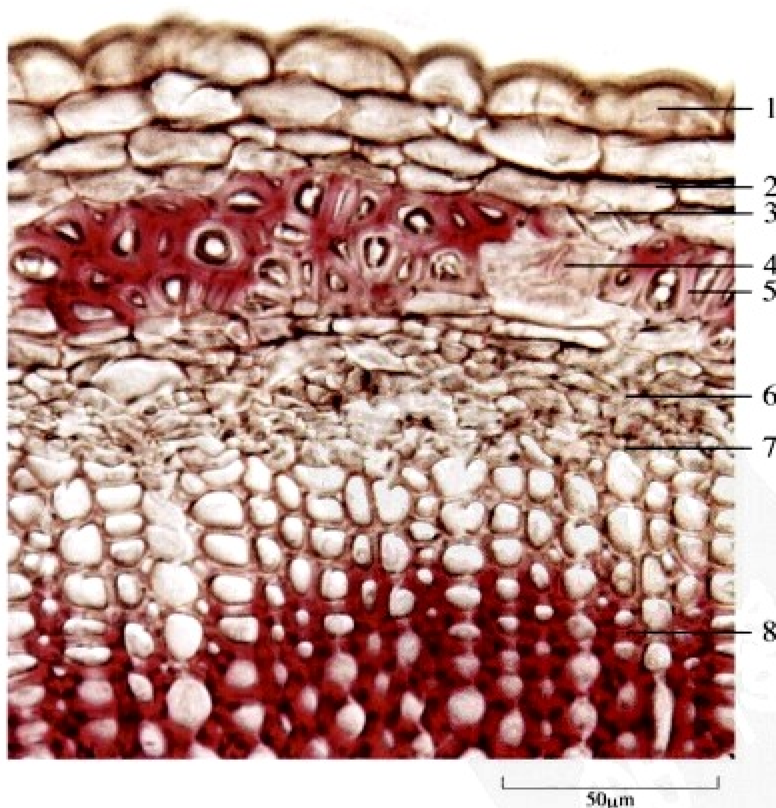


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 表皮细胞（Epidermis cells）　2. 皮层（Cortex）　3. 草酸钙方晶（Prisms of calcium oxalate）　4. 石细胞（Stone cells）　5. 中柱鞘纤维束（Pericycle fibre bundles）　6. 韧皮部（Phloem）　7. 形成层（Cambium）　8. 木质部（Xylem）

佛　手

Foshou

FRUCTUS CITRI SARCODACTYLIS

本品为芸香科植物佛手*Citrus medica* L. var. *sarcodactylis* Swingle 的干燥果实。

[显微特征]　本品粉末：淡棕黄色。中果皮薄壁组织众多，细胞呈不规则形或类圆形，壁不均匀增厚。果皮表皮细胞表面观呈不规则多角形，偶见类圆形气孔。草酸钙方晶成片存在于多角形的薄壁细胞中，呈多面形、菱形或双锥形。(图1)

Powder: Pale brownish-yellow. Parenchymatous cells of mesocarp numerous, irregular or subrounded, walls unevenly thickened. Epidermal cells of pericarp irregularly polygonal in surface view, subrounded stomata occasionally visible. Polygonal parenchymatous cells containing numerous prisms of calcium oxalate in polygonal, rhombic or bicone-like shapes. (Fig 1)

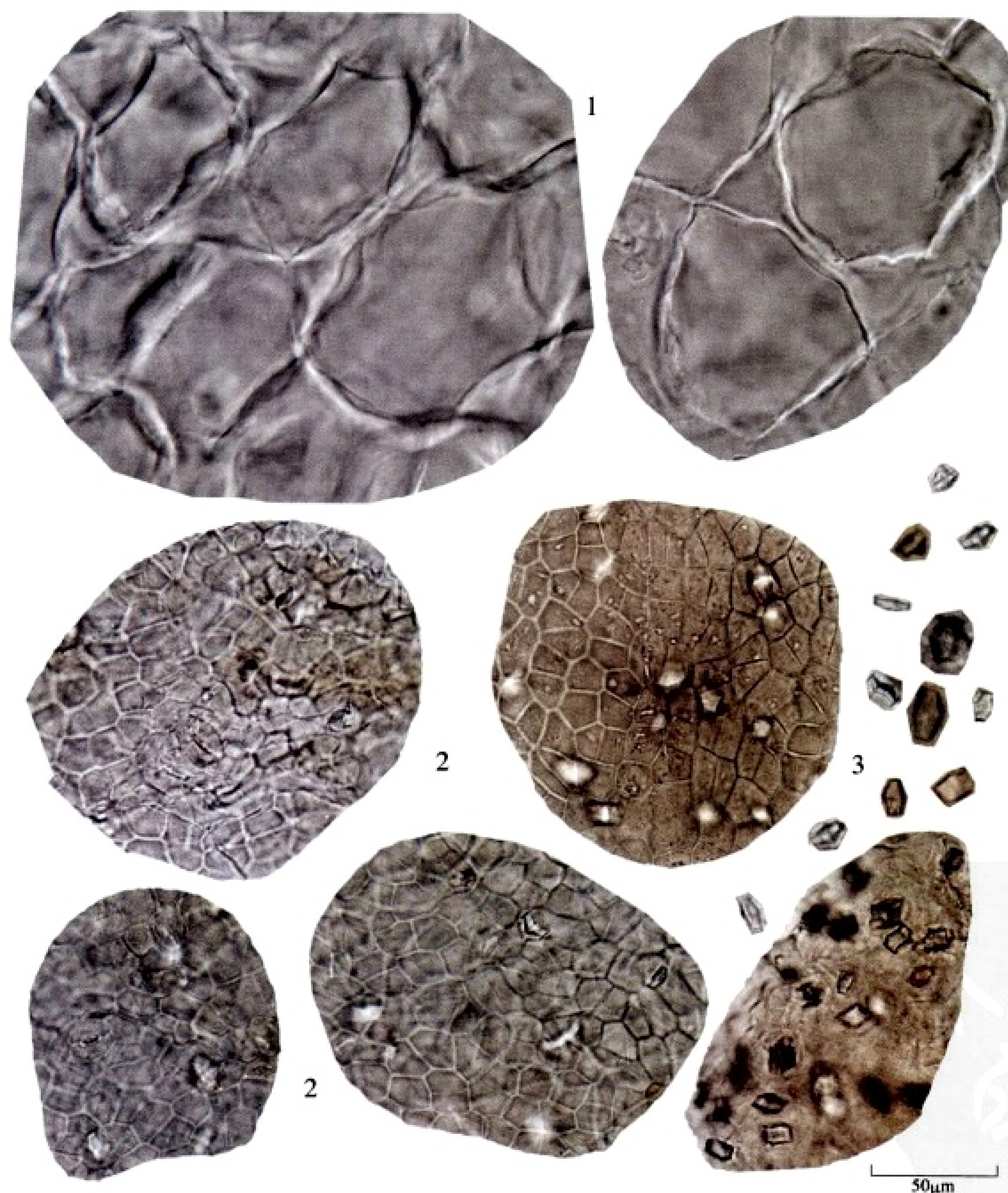


图1　佛手（*Citrus medica* var. *sarcodactylis* 果实）粉末

[Fig1　Powder of fruit from *Citrus medica* var. *sarcodactylis*]

1. 中果皮薄壁细胞（Parenchymatous cells of mesocarp）　2. 果皮表皮细胞及气孔（Epidermal cells and stomata of pericarp）　3. 草酸钙方晶（Prisms of calcium oxalate）

谷精草

Gujingcao

FLOS ERIOCAULI

本品为谷精草科植物谷精草*Eriocaulon buergerianum* Koern. 的干燥带花茎的头状花序。

[显微特征]　本品粉末：黄绿色。腺毛头部长椭圆形，1～4细胞，顶端细胞较长，表面有细密网状纹理；柄单细胞。非腺毛甚长，2～4细胞。种皮表皮细胞表面观扁长六角形，壁上衍生伞形支柱。花茎表皮细胞表面观长条形，表面有纵直角质纹理，气孔类长方形。果皮细胞表面观类多角形，垂周壁念珠状增厚。花粉粒类圆形，具螺旋状萌发孔。(图1)

Powder: Yellowish-green. The heads of glandular hairs long elliptical, 1～4 celled, apical cells relatively long, surface bearing densely fine reticulate striations, stalks unicellular. Non-glandular hairs extremely long, 2～4 celled. Epidermal cells of seed coat flat-long-hexagonal in surface view, walls bearing umbrella-shaped pillars. Epidermal cells of peduncle stripe-shaped in surface view, surface bearing longitudinal cuticulate striations, stomata subrectangular. Pericarp cells subpolygonal in surface view, anticlinal walls bead-like thickened. Pollen grains subrounded, bearing spiral-shaped germinal apertures. (Fig 1)



图1　谷精草（*Eriocaulon buergerianum* 带花茎的头状花序）粉末

[Fig1　Powder of capitulum with peduncles of *Eriocaulon buergerianum*]

1. 腺毛（Glandular hairs）　2. 非腺毛（Non-glandular hairs）　3. 种皮表皮细胞（Epidermal cells of seed coat）
4. 花茎表皮细胞（Epidermal cells of peduncle）　5. 果皮细胞（Pericarp cells）　6. 花粉粒（Pollen grains）

辛　夷

Xinyi

FLOS MAGNOLIAE

本品为木兰科植物望春花*Magnolia biondii* Pamp.、玉兰*Magnolia denudata* Desr. 或武当玉兰*Magnolia sprengeri* Pamp. 的干燥花蕾。

[显微特征]　本品粉末：灰绿色或淡黄绿色。非腺毛甚多，散在，多碎断；完整者2～4细胞，亦有单细胞，壁厚4～13μm，基部细胞短粗膨大，细胞壁极度增厚似石细胞。石细胞多成群，呈椭圆形、不规则形或分枝状，壁厚4～20μm，孔沟不甚明显，胞腔中可见棕黄色分泌物。油细胞较多，类圆形，有的可见微小油滴。苞片表皮细胞扁方形，垂周壁连珠状。(图1)

Powder: Greyish green or slightly yellowish green. Non-glandular hairs numerous, scattered and frequently broken, 2～4 celled when whole, unicellular also exist, walls 4 ～ 13 μm thick, the basal cells short and thick, obviously inflated, heavily thick-walled like stone cells. Stone cells grouped, elliptical, irregular or branched, walls 4～20 μm thick, pit canals indistinct, lumina containing brownish-yellow secretion. Oil cells frequent, subrounded, some containing little oil droplets. Epidermal cells of bract flat-squared, anticlinal walls beaded. (Fig 1)

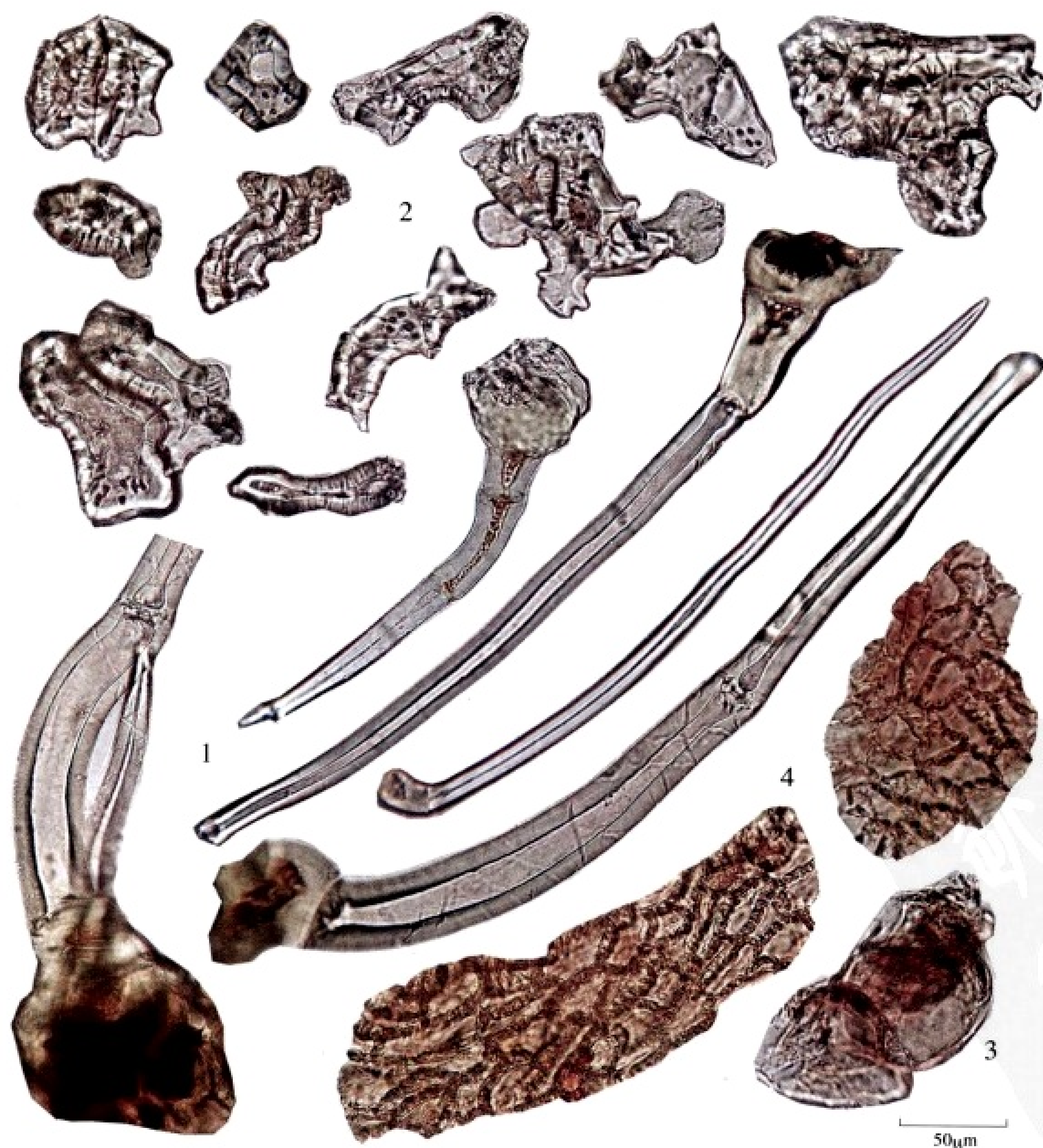


图1　辛夷（*Magnolia biondii* 花蕾）粉末

[Fig1　Powder of flower bud from *Magnolia biondii*]

1. 非腺毛（Non-glandular hairs）　2. 石细胞（Stone cells）　3. 油细胞（Oil cells）　4. 苞片表皮细胞（Epidermal cells of bract）

沙 棘

Shaji

FRUCTUS HIPPOPHAE

本品为胡颓子科植物沙棘*Hippophae rhamnoides* L. 的干燥成熟果实。

[显微特征] **果皮表面观**：果皮表皮细胞表面观多角形，垂周壁稍厚。表皮上盾状毛较多，由100多个单细胞毛毗连而成，末端分离，单个细胞长80～220μm，直径约5μm，毛脱落后的瘢痕由7～8个圆形细胞聚集而成，细胞壁稍厚。果肉薄壁细胞含多数橙红色或橙黄色颗粒状物。鲜黄色油滴甚多。（图1 ）

Surface view of pericarp: Epidermal cells of pericarp polygonal in surface view, anticlinal walls slightly thickened. Peltate hairs numerous on epidermis, consisting of more than 100 unicellular hairs, the terminal ends separated, each cell 80～220 μm long, about 5 μm in diameter. The scars of fallen hairs grouped with 7～8 rounded cells, with slightly thickened walls. Parenchymatous cells of sarcocarp containing numerous orange-red or orange-yellow granular contents. Bright yellow oil droplets numerous. (Fig 1)



图1 沙棘（*Hippophae rhamnoides* 果实）果皮表面观

[Fig1 Surface view of pericarp from *Hippophae rhamnoides*]

1. 果皮表皮细胞（Epidermal cells of pericarp） 2. 盾状毛（Peltate haris） 3. 毛脱落后的瘢痕（Scars of fallen hair） 4. 颗粒状物（Granular contents） 5. 油滴（Oil droplets）

沉　　香

Chenxiang

LIGNUM AQUILARIAE RESINATUM

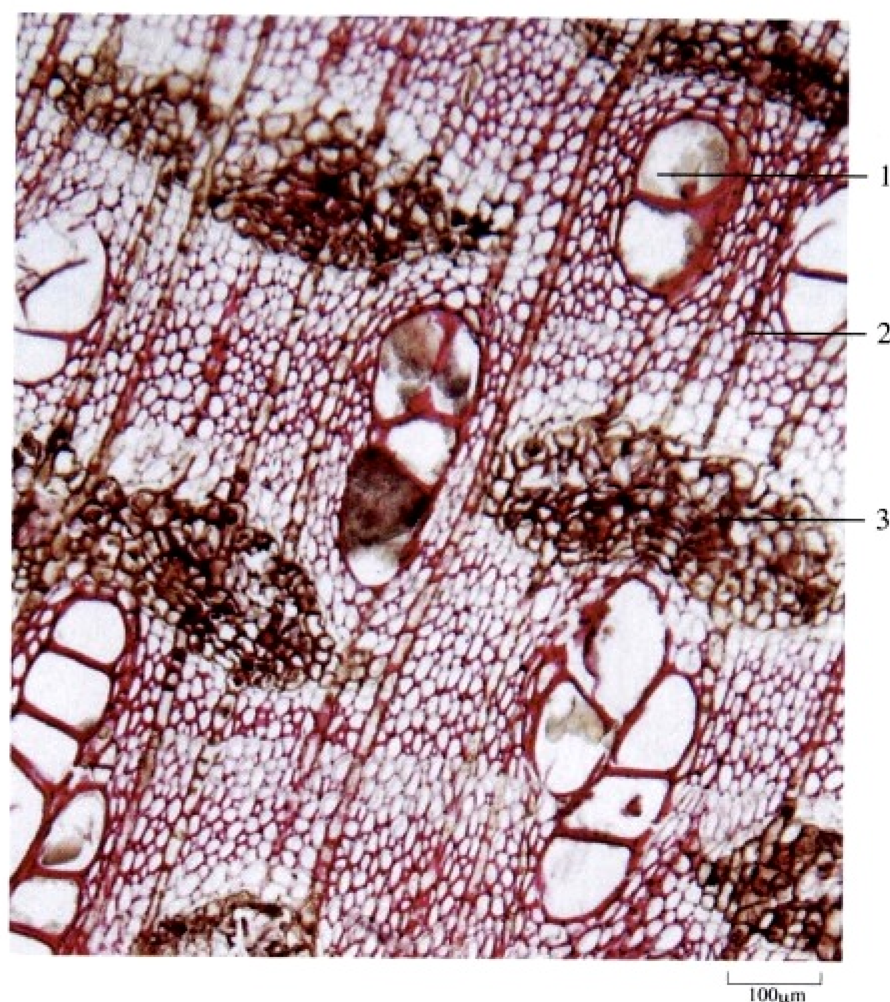


图1　白木香（*Aquilaria sinensis* 含树脂的木材）横切面

[Fig1　Transverse section of resin-containing wood from *Aquilaria sinensis*]

1. 导管（Vessels）　2. 射线（Rays）　3. 木间韧皮部（Interxylary phloem）

本品为瑞香科植物白木香*Aquilaria sinensis*（Lour.）Gilg含树脂的木材。

[显微特征]　**本品横切面**：射线宽1～2列细胞，充满棕色树脂。导管圆多角形，直径42～128μm，有的含棕色树脂。木纤维多角形，直径20～45μm，壁稍厚，木化。木间韧皮部扁长椭圆状或条带状，常与射线相交，细胞壁薄，非木化，内含棕色树脂；其间散有少数纤维，有的薄壁细胞含草酸钙柱晶。（图1、2）

Transverse section: Rays 1～2 cells wide, filled with brown resin. Vessels round-polygonal, 42～128 μm in diameter, someones containing brown resin. Xylary fibres polygonal, 20～45 μm in diameter, with slightly thickened and lignified walls. Interxylary phloem elongated-elliptical or strip-shaped, usually intersecting with rays, and the cells with thin and non-lignified walls, containing brown resin; a few of fibres scattered, some parenchymatous cells containing prisms of calcium oxalate. (Fig 1, 2)

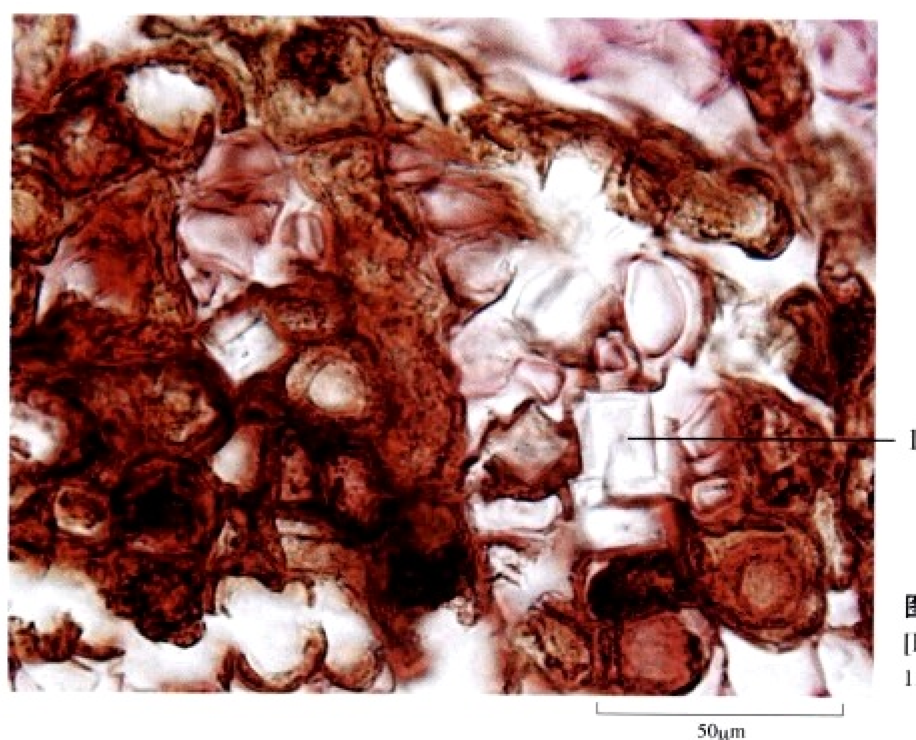


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 草酸钙柱晶（Prisms of calcium oxalate）

灵　　芝

Lingzhi

GANODERMA

本品为多孔菌科真菌赤芝*Ganoderma lucidum*（Leyss. ex Fr.）Karst. 或紫芝*Ganoderma sinense* Zhao，Xu et Zhang 的干燥子实体。

[显微特征]　本品粉末：浅棕色、棕褐色至紫褐色。菌丝散在或粘结成团，无色或淡棕色，细长，稍弯曲，有分枝，直径2.5～6.5μm。孢子褐色，卵形，顶端平截，外壁无色，内壁有疣状突起，长8～12μm，宽5～8μm。（图1）

Powder: Pale brown, dark brown to yellowish-brown. Hyphae scattered or grouped, colourless or pale brown, slim, slightly curved, branched, 2.5～6.5μm in diameter. Spores brown, ovate, apex even, external walls colourless, internal walls with protuberance, 8～12 μm long, 5～8 μm wide.（Fig 1）



图1　灵芝（*Ganoderma lucidum* 子实体）粉末

[Fig1　Powder of sporophore from *Ganoderma lucidum*]

1. 菌丝（Hyphae）　2. 孢子（Spores）

陈 皮

Chenpi

PERICARPIUM CITRI RETICULATAE

本品为芸香科植物橘 *Citrus reticulata* Blanco 及其栽培变种的干燥成熟果皮。

[显微特征] **本品粉末：** 黄白色至黄棕色。中果皮薄壁组织众多，细胞形状不规则，壁不均匀增厚，有的成连珠状。果皮表皮细胞表面观多角形、类方形或长方形，垂周壁稍厚，气孔类圆形，直径18～26μm，副卫细胞不清晰；侧面观外被角质层，靠外方的径向壁增厚。草酸钙方晶成片存在于中果皮薄壁细胞中，呈多面体形、菱形或双锥形，直径3～34μm，长5～53μm，有的一个细胞内含有由两个多面体构成的平行双晶或3～5个方晶。橙皮苷结晶大多存在于薄壁细胞中，黄色或无色，呈类圆形或无定形团块，有的可见放射状条纹。螺纹导管、孔纹导管和网纹导管及管胞较小。（图1）

Powder: Yellowish-white to yellowish-brown. Parenchymatous cells of mesocarp numerous, cells irregular, with unevenly thickened walls, sometimes beaded. Epidermal cells of pericarp polygonal, subsquare or rectangular in surface view, anticlinal walls thickened, stomata subrounded, 18～26μm in diameter, subsidiary cells indistinct; covered with cuticle in lateral view and the outer part of radial walls thickened. Numerous prisms of calcium oxalate contained in parenchymatous cells of the mesocarp, polygonal, rhombic or biconical, 3～34μm in diameter, 5～53μm long; sometimes two parallel polygonal crystals or 3～5 prisms occurring in one cell. Crystals of hesperidin mostly present in parenchymatous cells, yellow or colourless, in subspheroid or amorphous masses, some crystals with radial striations. Spiral, pitted and reticulated vessels and tracheids small. (Fig 1)



图1 陈皮（*Citrus reticulata* 果皮）粉末

[Fig1 Powder of pericarp from *Citrus reticulata*]

1. 中果皮细胞（Mesocarp cells） 2. 果皮表皮细胞（Epidermal cells of pericarp） 3. 草酸钙方晶（Prisms of calcium oxalate） 4. 橙皮苷结晶（Crystals of hesperidin） 5. 导管（Vessels）

鸡　血　藤

Jixueteng

CAULIS SPATHOLOBI

本品为豆科植物密花豆*Spatholobus suberectus* Dunn的干燥藤茎。

[显微特征]　本品横切面：木栓细胞数列，含棕红色物。皮层较窄，散有石细胞群，胞腔内充满棕红色物；薄壁细胞含草酸钙方晶。维管束异型，韧皮部与木质部相间排列成数轮。韧皮部最外侧为石细胞群与纤维束组成的厚壁细胞层；射线多被挤压；分泌细胞甚多，充满棕红色物，常数个至10多个切向排列成带状；纤维束较多，非木化至微木化，周围细胞含草酸钙方晶，形成晶纤维，含晶细胞壁木化增厚；石细胞群散在。木质部射线有的含棕红色物；导管多单个散在，类圆形，直径约至400μm；木纤维束亦均形成晶纤维；木薄壁细胞少数含棕红色物。(图1～3)

Transverse section: Cork consisting of several layers of cells with brownish-red contents. Cortex relatively narrow, showing groups of stone cells filled with brownish-red contents in lumina; parenchymatous cells containing prisms of calcium oxalate. Vascular bundles abnormal, phloem alternating with xylem in several whorls. In phloem, the outermost part being a layer of sclerenchymatous cells consisting of groups of stone cells and fibre bundles, rays mostly pressed; secretory cells abundant, filled with brownish-red contents, usually several to 10 or more grouped and arranged tangentially in zonal form; fibre bundles relatively abundant, non-lignified to slightly lignified, surrounded by cells containing prisms of calcium oxalate, forming crystal fibres, the walls of crystal cells lignified and thickened; groups of stone cells scattered. Xylem rays sometimes containing brownish-red contents; vessels mostly singly scattered, subrounded, up to 400 μm in diameter; bundles of xylary fibres also forming crystal fibres; a few of xylary parenchymatous cells containing brownish-red contents. (Fig 1～3)

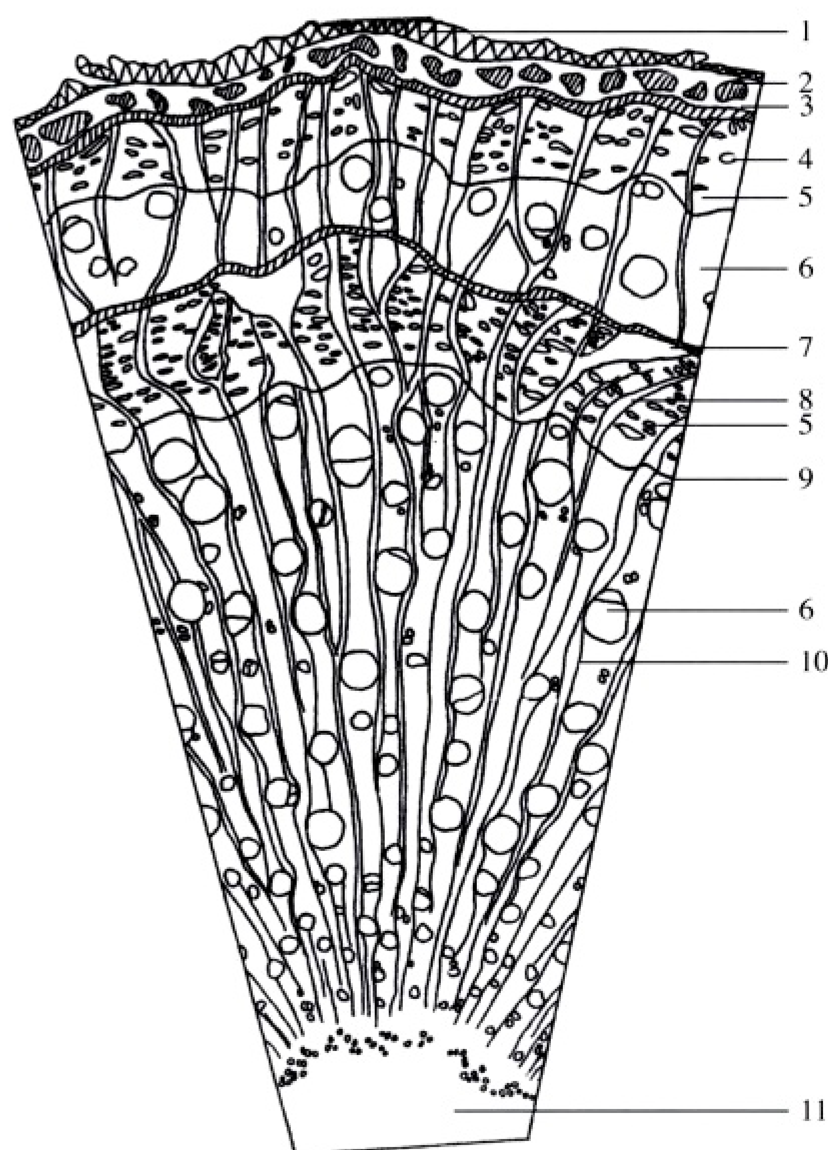


图1　鸡血藤（*Spatholobus suberectus* 藤茎）横切面简图

[Fig1　General picture of transverse section of lianoid stem from *Spatholobus suberectus*]

1. 木栓层（Cork）　2. 石细胞群（Groups of stone cells）　3. 皮层（Cortex）　4. 分泌细胞（Secretory cells）　5. 韧皮部（Phloem）　6. 木质部（Xylem）　7. 厚壁细胞层（Layer of sclerenchymatous cells）　8. 韧皮射线（Phloem rays）　9. 形成层（Cambium）　10. 木射线（Xylem rays）　11. 髓（Pith）

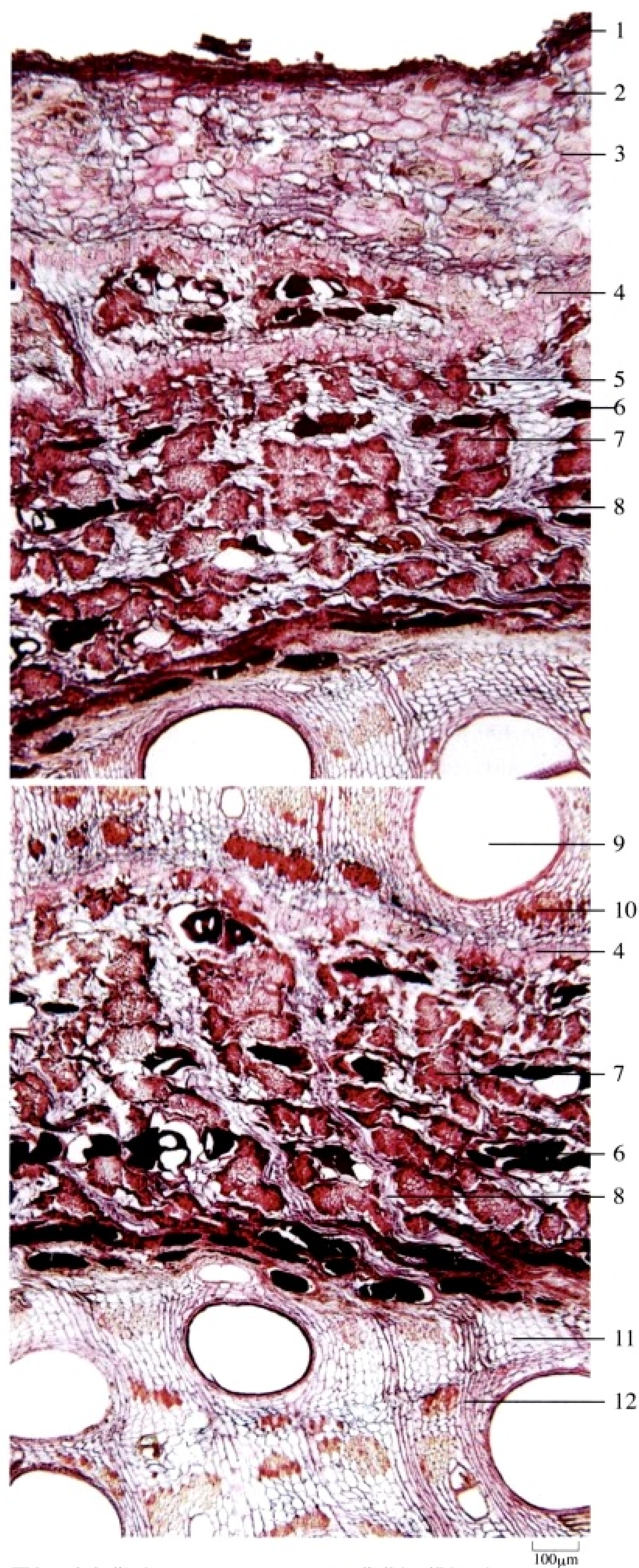


图2　鸡血藤（*Spatholobus suberectus* 藤茎）横切面

[Fig2　Transverse section of lianoid stem from *Spatholobus suberectus*]

1. 木栓层（Cork）　2. 皮层（Cortex）　3. 石细胞群（Groups of stone cells）　4. 厚壁细胞层（Layer of sclerenchymatous cells）　5. 韧皮部（Phloem）　6. 分泌细胞（Secretory cells）　7. 韧皮纤维束(Phloem fibre bundles)　8. 韧皮射线(Phloem rays)　9. 导管(Vessels)　10. 木纤维束（Xylem fibre bundles）　11. 木薄壁细胞（Xylem parenchymatous cells）　12. 木射线（Xylem rays）

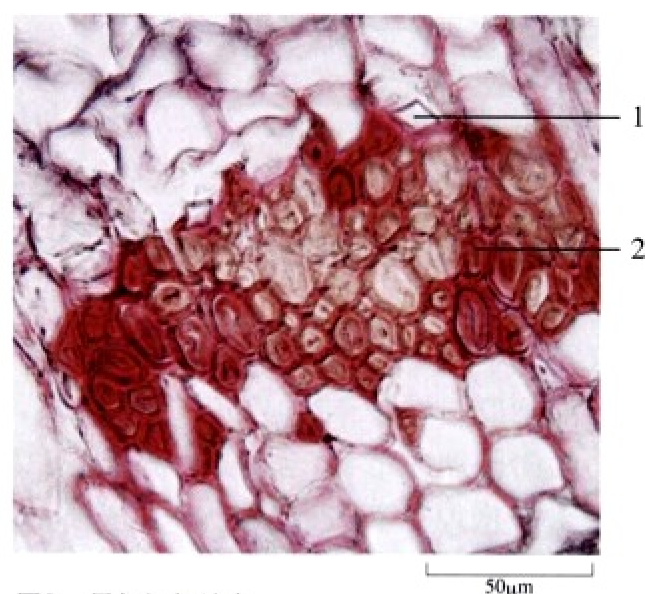


图3　局部组织放大

[Fig3　Partial tissue magnified]

1. 草酸钙方晶（Prisms of calcium oxalate）　2. 纤维束（Fibre bundle）

鸡 骨 草

Jigucao

HERBA ABRI

本品为豆科植物广州相思子*Abrus cantoniensis* Hance 的干燥全株。

[显微特征]　本品粉末：灰绿色。非腺毛单细胞，顶端尖或长尖，长60～970μm，直径12～22μm，壁厚3～6μm，层纹明显，有疣状突起。气孔平轴式。纤维束周围细胞含草酸钙方晶，形成晶纤维，含晶细胞壁不均匀增厚。石细胞类圆形、类方形或长圆形，直径16～40μm，有的壁稍厚。木栓细胞黄棕色。草酸钙方晶直径5～11μm。（图1）

Powder: Greyish-green. Non-glandular hairs unicellular, acute or acuminate at the apex, 60 ~ 970 μm long, 12 ~ 22 μm in diameter, walls 3 ~ 6 μm thick, with distinct striations and warty prominences. Stomata paracytic. Fibre bundles surrounded by cells containing prisms of calcium oxalate, forming crystal fibres, walls of crystal cells irregularly thickened. Stone cells subrounded, subsquare or oblong, 16 ~ 40 μm in diameter, some with slightly thickened walls. Cork cells yellowish-brown. Prisms of calcium oxalate 5 ~ 11 μm in diameter. （Fig 1）

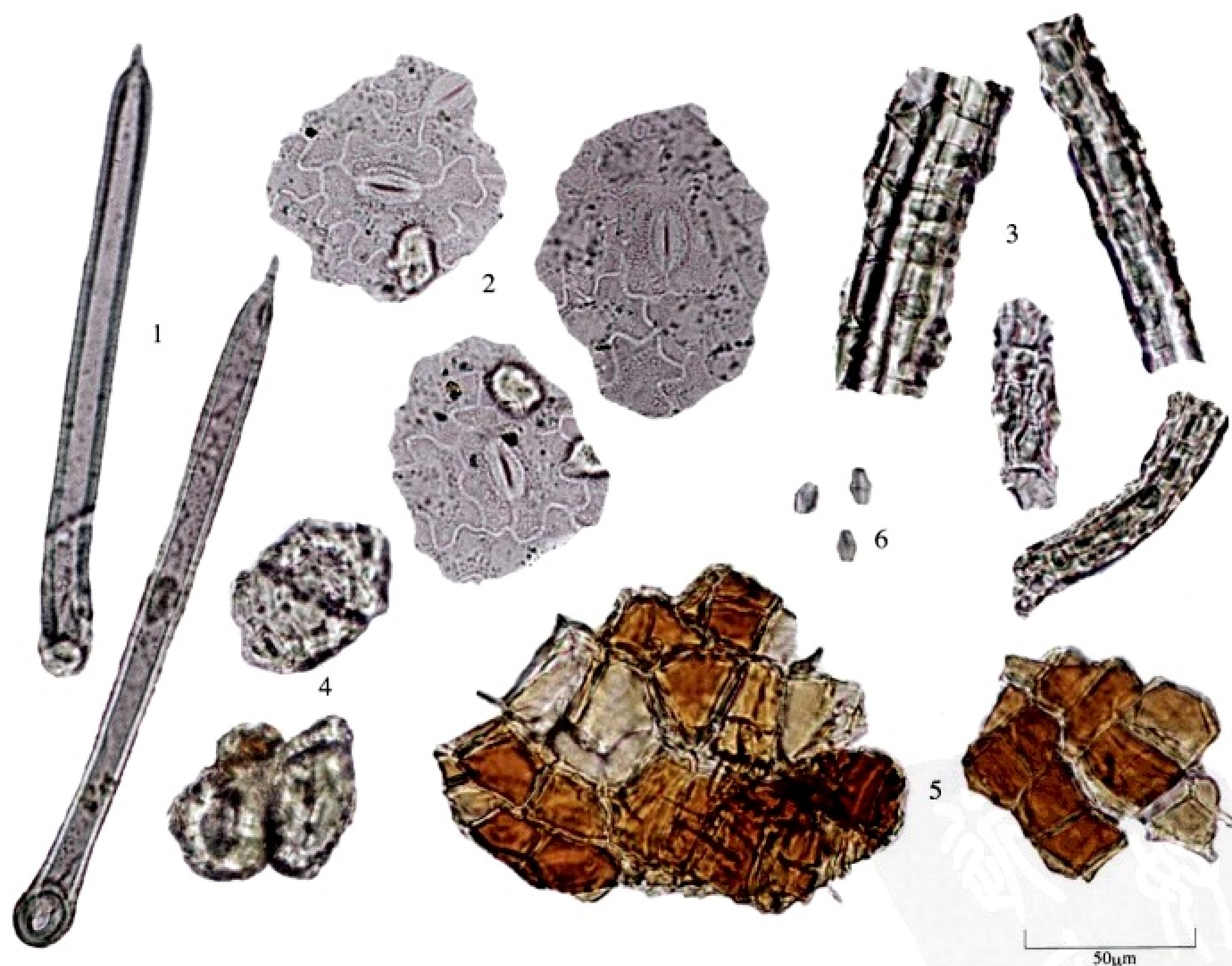


图1　鸡骨草（*Abrus cantoniensis* 全株）粉末

[Fig1　Powder of herb from *Abrus cantoniensis*]

1. 非腺毛（Non-glandular hairs）　2. 气孔（Stomata）　3. 晶纤维（Crystal fibres）　4. 石细胞（Stone cells）　5. 木栓细胞（Cork cells）　6. 草酸钙方晶（Prisms of calcium oxalate）

青 风 藤

Qingfengteng

CAULIS SINOMENII

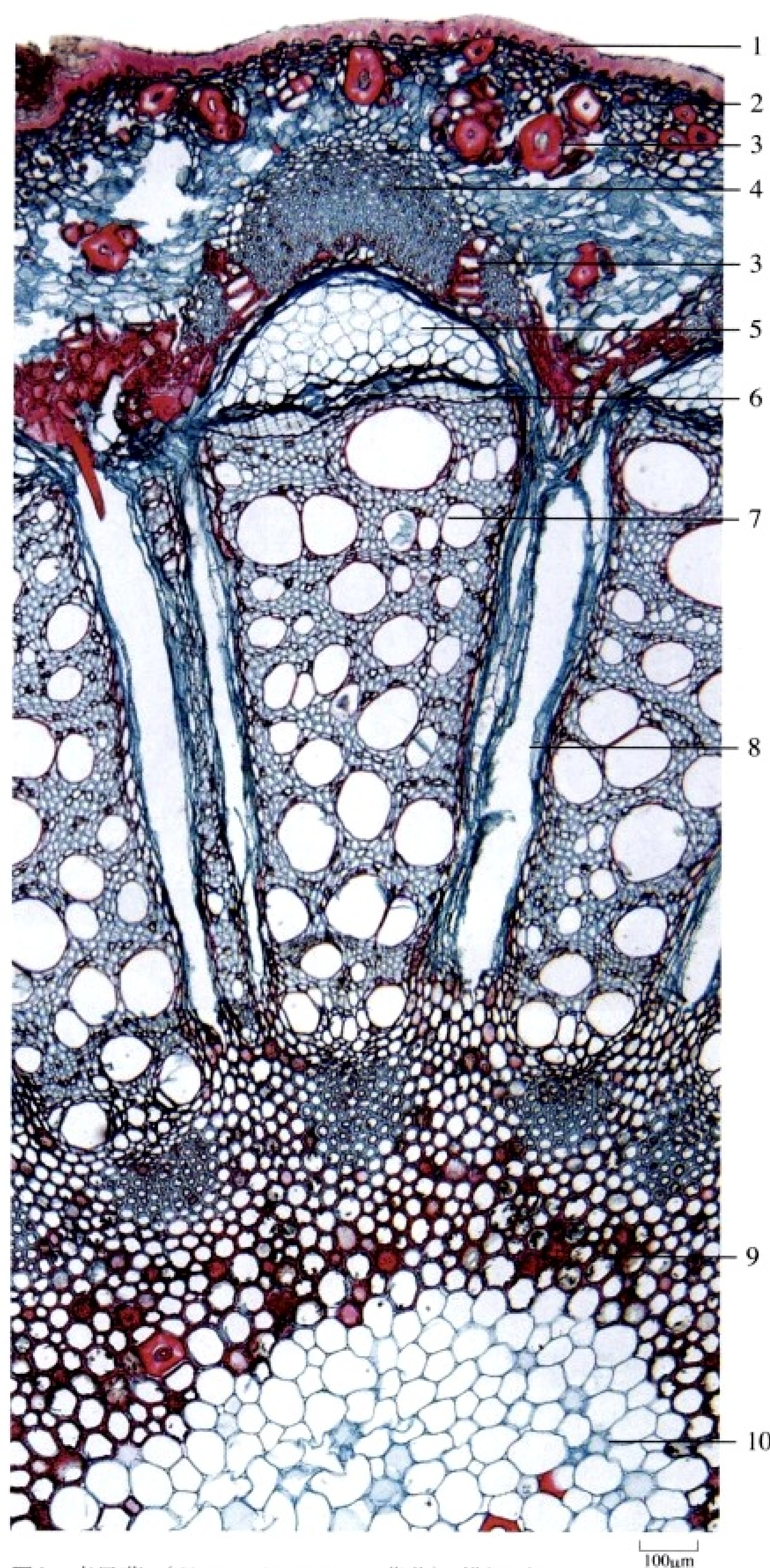


图1　青风藤（*Sinomenium acutum* 藤茎）横切面

[Fig1　Transverse section of lianoid stem from *Sinomenium acutum*]

1. 表皮（Epidermis）　2. 纤维（Fibres）　3. 石细胞（Stone cells）　4. 中柱鞘纤维束（Pericyclic fibre bundles）　5. 韧皮部（Phloem）　6. 形成层（Cambium）　7. 木质部（Xylem）　8. 射线（Rays）　9. 厚壁细胞（Sclerenchymatous cells）　10. 髓（Pith）

本品为防己科植物青藤*Sinomenium acutum*（Thunb.）Rehd. et Wils.及毛青藤*Sinomenium acutum*（Thunb.）Rehd. et Wils. var. *cinereum* Rehd. et Wils. 的干燥藤茎。

[显微特征]　本品横切面：最外层为表皮外被厚角质层，或为木栓层。皮层散有纤维及石细胞。中柱鞘纤维束新月形，其内侧常为2～5列石细胞，并切向延伸与射线中的石细胞群连接成环。维管束外韧型。韧皮射线向外渐宽，可见锥形或分枝状石细胞；韧皮部细胞大多颓废，有的散有1～3个纤维。木质部导管单个散在或数个切向连接。环髓细胞壁稍厚，纹孔明显。薄壁细胞含淀粉粒及草酸钙针晶。（图1、2）

Transverse section: The outmost of epidermis covered with thick cuticle, or cork. Cortex scattered with fibres and stone cells. Pericyclic fibre groups in crescent shape, the inner side of fibre groups usually possessing 2～5 layers of stone cells, tangentially elongated and linked with stone cell groups in rays to a ring. Vascular bundles collateral. Phloem rays gradually widened outwards, occurring conical or branched stone cells; phloem cells mostly collapsed, sometimes scattered with 1～3 fibres. Xylem vessels singly scattered or several linked up tangentially. The walls of cells surrounding pith relatively thickened, distinctly pitted. Parenchymatous cells containing starch granules and needle crystals of calcium oxalate.（Fig 1, 2）

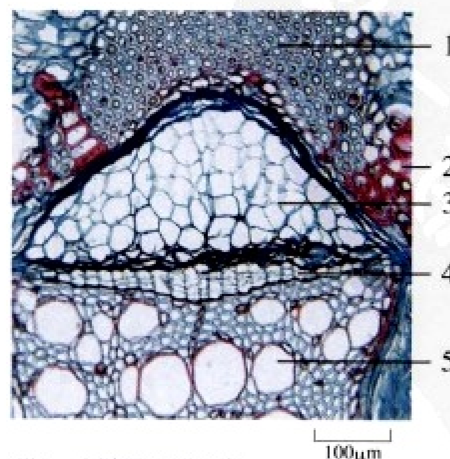


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 中柱鞘纤维束（Pericyclic fibre bundle）　2. 石细胞（Stone cells）　3. 韧皮部（Phloem）　4. 形成层（Cambium）　5.木质部（Xylem）

本品粉末：黄褐色或灰褐色。表皮细胞黄色或黄棕色，断面观类圆形或矩圆形，直径24～78μm；被有角质层。石细胞淡黄色或黄色，类方形、梭形、椭圆形或不规则形，壁较厚，孔沟明显。皮层纤维微黄色或黄色，直径27～70 μm，壁极厚，胞腔狭窄。草酸钙针晶细小，存在于薄壁细胞中。（图3）

Powder: Yellowish-brown or greyish-brown. Epidermal cells yellow or yellowish-brown, subrounded or oblong in lateral view, 24～78 μm in diameter, covered with cuticle. Stone cells pale yellow or yellow, subsquare, fusiform, elliptical or irregular, walls relatively thickened, pit canals distinct. Cortex fibres pale yellow or yellow, 27～70 μm in diameter, with heavily thickened walls and narrow lumina. Needle crystals of calcium oxalate small, occurring in parenchymatous cells. (Fig 3)



图3 青风藤（*Sinomenium acutum* 藤茎）粉末

[Fig3 Powder of lianoid stem from *Sinomenium acutum*]

1. 表皮细胞（Epidermal cells） 2. 石细胞（Stone cells） 3. 纤维（Fibres） 4. 薄壁细胞含草酸钙针晶（Parenchymatous cells containing needles of calcium oxalate）

青 叶 胆

Qingyedan

HERBA SWERTIAE MILEENSIS

本品为龙胆科植物青叶胆*Swertia mileensis* T. N. Ho et W. L. Shih 的干燥全草。

[显微特征]　本品粉末：绿色或黄绿色。石细胞类圆形、类长方形、长条形或长梭形，有的有突起或一端延长，长100～120μm，直径40～50μm，木化，壁厚5～10μm，孔沟明显。纤维长梭形，长180～220μm，直径8～10μm，木化，壁厚约2.5μm，孔沟明显。叶的上表皮细胞壁波状；下表皮细胞角质纹理不甚明显，气孔多数，不等式或不定式。草酸钙结晶呈杆状、针状或片状，多存在于叶肉细胞中。花粉粒圆形，直径30～37μm，具3孔沟，表面有细网状纹理。（图1）

Powder: Green or yellowish-green. Stone cells subrounded, subrectangular, elongated stripe-shaped or fusiform, sometimes prominent or elongated at one end, 100 ~ 120 μm long, 40 ~ 50 μm in diameter, lignified, walls 5 ~ 10 μm thick, pit canals distinct. Fibres long-fusiform, 180 ~ 220 μm long, 8 ~ 10 μm in diameter, lignified, walls about 2.5 μm thick, with distinct pit canals. Upper epidermal cells of leaves with sinuous walls; lower epidermal cells with indistinct cuticle striations, stomata numerous, anisocytic or anomocytic. Crystals of calcium oxalate frequently occurring in rod, needle or plate shape in the mesophyll cells. Pollen grains rounded, 30 ~ 37 μm in diameter, with 3 germinal furrows and finely reticulated striations on the surface. (Fig 1)



图1　青叶胆（*Swertia mileensis* 全草）粉末

[Fig1　Powder of herb from *Swertia mileensi*]

1. 石细胞（Stone cells）　2. 纤维（Fibres）　3. 叶上表皮细胞（Upper epidermal cells of leaves）　4. 叶下表皮细胞（Lower epidermal cells of leaves）　5. 草酸钙结晶（Crystals of calcium oxalate）　6. 花粉粒（Pollen grains）

青　　皮

Qingpi

PERICARPIUM CITRI RETICULATAE VIRIDE

本品为芸香科植物橘*Citrus reticulata* Blanco 及其栽培变种的干燥幼果或未成熟果实的果皮。

[显微特征] 本品粉末：**四花青皮**　灰绿色或淡灰棕色。中果皮薄壁组织众多，细胞形状不规则，壁稍增厚，有的成连珠状。果皮表皮细胞表面观多角形或类方形，垂周壁增厚，气孔长圆形，直径20～28μm，副卫细胞5～7个；断面观外被角质层，靠外方的径向壁稍增厚。草酸钙方晶存在于近表皮的薄壁细胞中，呈多面体形、菱形或方形，直径3～28μm，长至32μm。橙皮苷结晶棕黄色，呈半圆形、类圆形或无定型团块。螺纹导管、网纹导管细小。（图1）

Powder of Sihuaqingpi: Greyish-green or pale greyish-brown. Parenchyma of mesocarp numerous, irregular walls slightly thickened, some beaded. Epidermal cells of pericarp polygonal or subsquare in surface view, anticlinal walls thickened, stomata oblong, 20～28 μm in diameter, subsidiary cells 5～7; covered with cuticle in lateral view, the outer part of radial walls slightly thickened. Prisms of calcium oxalate occurring in parenchymatous cells adjacent to the epidermis, polygonal, rhombic or square, 3～28 μm in diameter, up to 32 μm long. Crystals of hesperidin brownish-yellow, hemispherical, subrounded or in irregular masses. Spiral and reticulated vessels small. (Fig 1)

个青皮　瓢囊表皮细胞狭长，壁薄，有的呈微波状，细胞中含草酸钙方晶，并含橙皮苷结晶。

Geqingpi: Epidermal cells of pulp vesicle narrowly prolate, walls thin, some slightly sinuous, containing prisms of calcium oxalate, also containing crystals of hesperidin.



图1　青皮（*Citrus reticulata* 果皮）粉末

[Fig1　Powder of pericarp from *Citrus reticulate*]

1. 中果皮细胞 (Cells of mesocarp)　2. 果皮表皮细胞[Epidermal cells of pericarp (a.表面观Surface view b.断面观Section view)]　3. 草酸钙方晶 (Prisms of calcium oxalate)　4. 橙皮苷结晶 (Crystals of hesperidin)　5. 导管 (Vessels)

青 果
Qingguo
FRUCTUS CANARII

本品为橄榄科植物橄榄*Canarium album* Raeusch. 的干燥成熟果实。

[显微特征] **本品果皮横切面**：外果皮为1～3列厚壁细胞，含黄棕色物，外被角质层。中果皮为10余列薄壁细胞，有维管束散在，油室多散列于维管束的外侧。内果皮为数列石细胞。薄壁细胞含草酸钙簇晶和方晶。(图1～3)

Transverse section of pericarp: Exocarp consisting of 1～3 layers of sclerenchymatous cells, containing yellowish-brown contents, and covered with cuticle. Mesocarp of about 10 layers of parenchymatous cells, scattered with vascular bundles, oil cavities mostly scattering at the outside of vascular bundles. Endocarp consisting of several layers of stone cells. Parenchymatous cells containing clusters or prisms of calcium oxalate. (Fig 1～3)

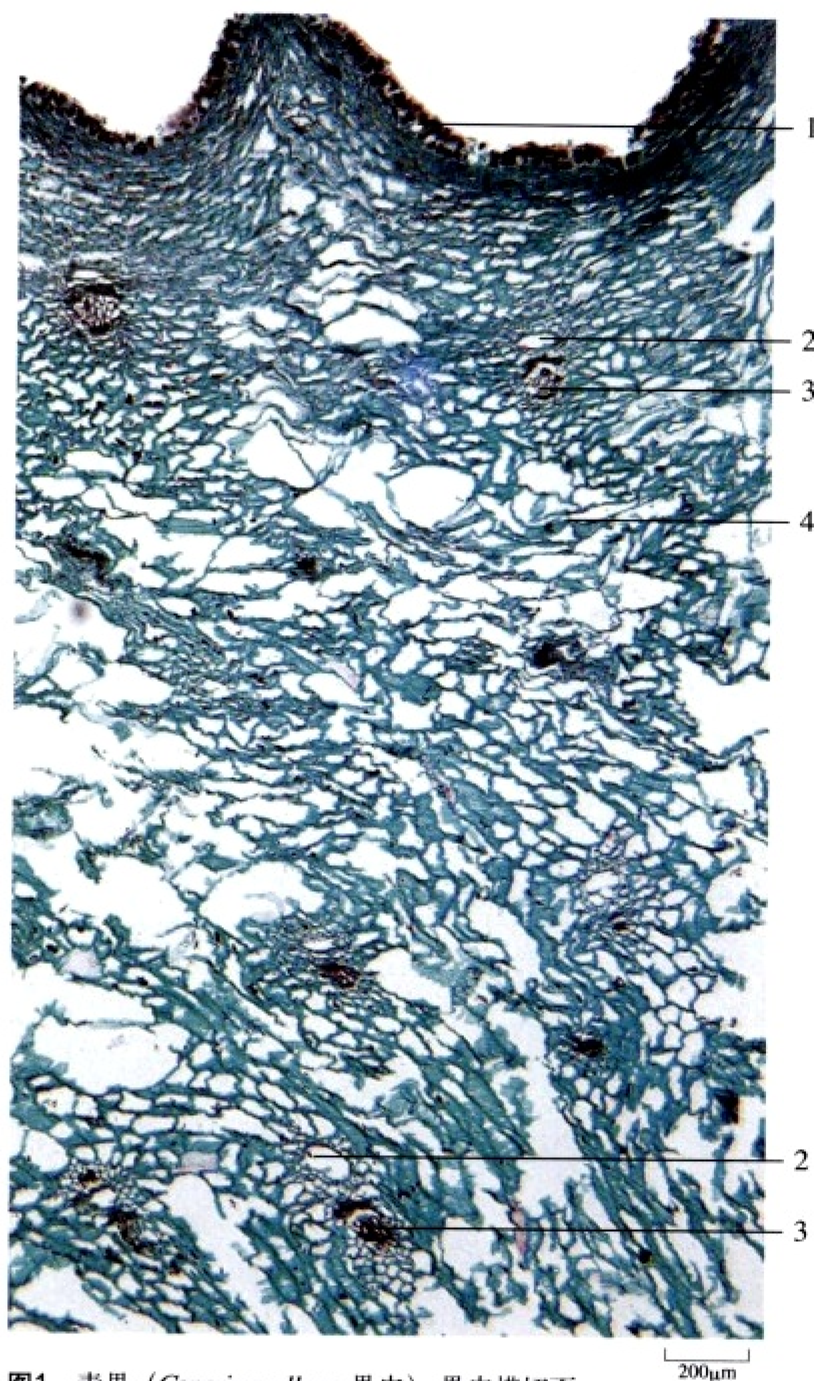


图1 青果（*Canarium album* 果皮） 果皮横切面

[Fig1 Transverse section of pericarp from *Canarium album*]

1. 外果皮细胞（Exocarp cells） 2. 油室（Oil cavities） 3. 维管束（Vascular bundles） 4. 中果皮（Mesocarp）

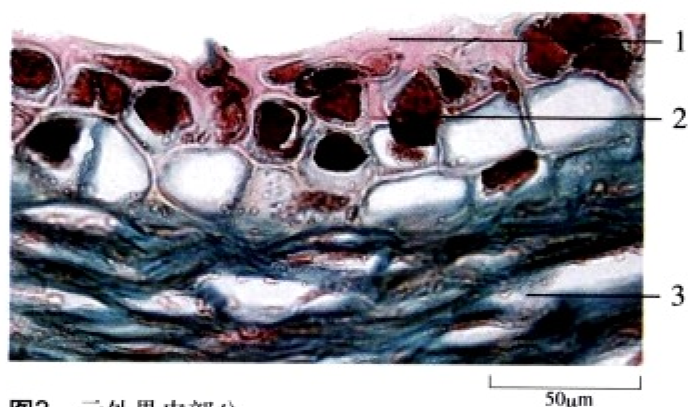


图2 示外果皮部分

[Fig2 Showing exocarp]

1.角质层（Cuticle layer） 2. 外果皮细胞（Exocarp cells） 3. 中果皮（Mesocarp）

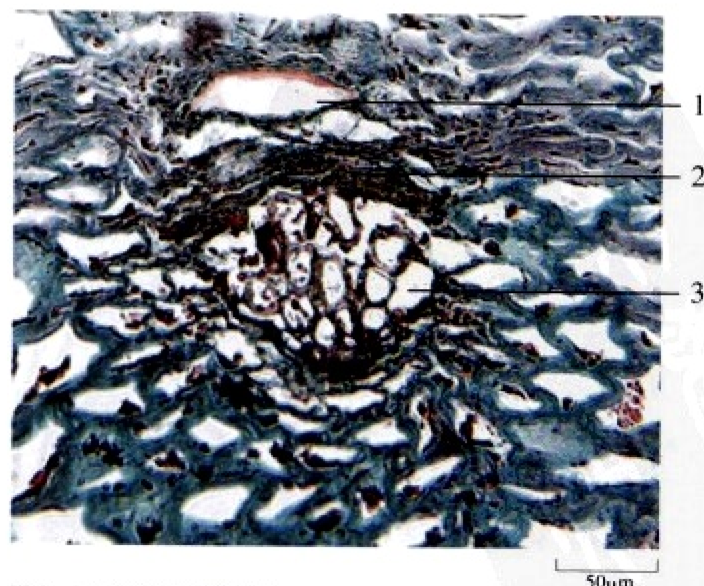


图3 示中果皮维管束

[Fig3 Showing vascular bundle of mesocarp]

1. 油室（Oil cavity） 2. 韧皮部（Phloem） 3. 木质部（Xylem）

玫　瑰　花

Meiguihua

FLOS ROSAE RUGOSAE

本品为蔷薇科植物玫瑰*Rosa rugosa* Thunb. 的干燥花蕾。

[显微特征]　本品萼片表面观：非腺毛较密，单细胞，多弯曲，长136～680μm，壁厚，木化。腺毛头部多细胞，扁球形，直径64～180μm；柄部多细胞多列性，长50～340μm，基部有时可见单细胞分枝。草酸钙簇晶直径9～25μm。（图1）

Surface view of calyx: Non-glandular hairs densely covered, unicellular, frequently curved, 136～680μm long, with thickened and lignified walls. Glandular hairs, with multicellular heads and multicellular multiseriated stalks, heads oblate, 64～180μm in diameter, stalks 50～340μm long, sometimes showing unicellular branches at the base. Clusters of calcium oxalate 9～25μm in diameter. （Fig 1）



图1　玫瑰花（*Rosa rugosa* 萼片）表面观

[Fig1　Surface view of calyx from *Rosa rugosa*]

1. 非腺毛（Non-glandular hairs）　2. 腺毛（Glandular hairs）　3. 草酸钙簇晶（Clusters of calcium oxalate）

苦　木

Kumu

RAMULUS ET FOLIUM PICRASMAE

本品为苦木科植物苦木*Picrasma quassioides*（D. Don） Benn. 的干燥枝及叶。

[显微特征]　本品粉末：黄绿色。叶上表皮细胞呈多边形；下表皮气孔甚多，气孔不定式。叶肉细胞中含众多草酸钙簇晶。纤维成束，细长，周围薄壁细胞含草酸钙簇晶，偶见方晶。网纹及具缘纹孔导管巨大，多破碎。木射线细胞高1～8列细胞，宽1～3列细胞，细胞壁稍厚，纹孔较明显。（图1）

Powder: Yellowish-green. Upper epidermal cells of leaf polygonal; stomata anomocytic, frequently visible on the lower epidermis. Mesophyll cells containing abundant clusters of calcium oxalate. Fibra slender, in bundles, surrounded by cells containing clusters or rarely prisms of calcium oxalate. Reticulated and bordered pitted vessels large, mostly broken. Xylem rays 1～8 cells high and 1～3 cells wide; cells with slightly thickened walls and obvious pits.（Fig 1）

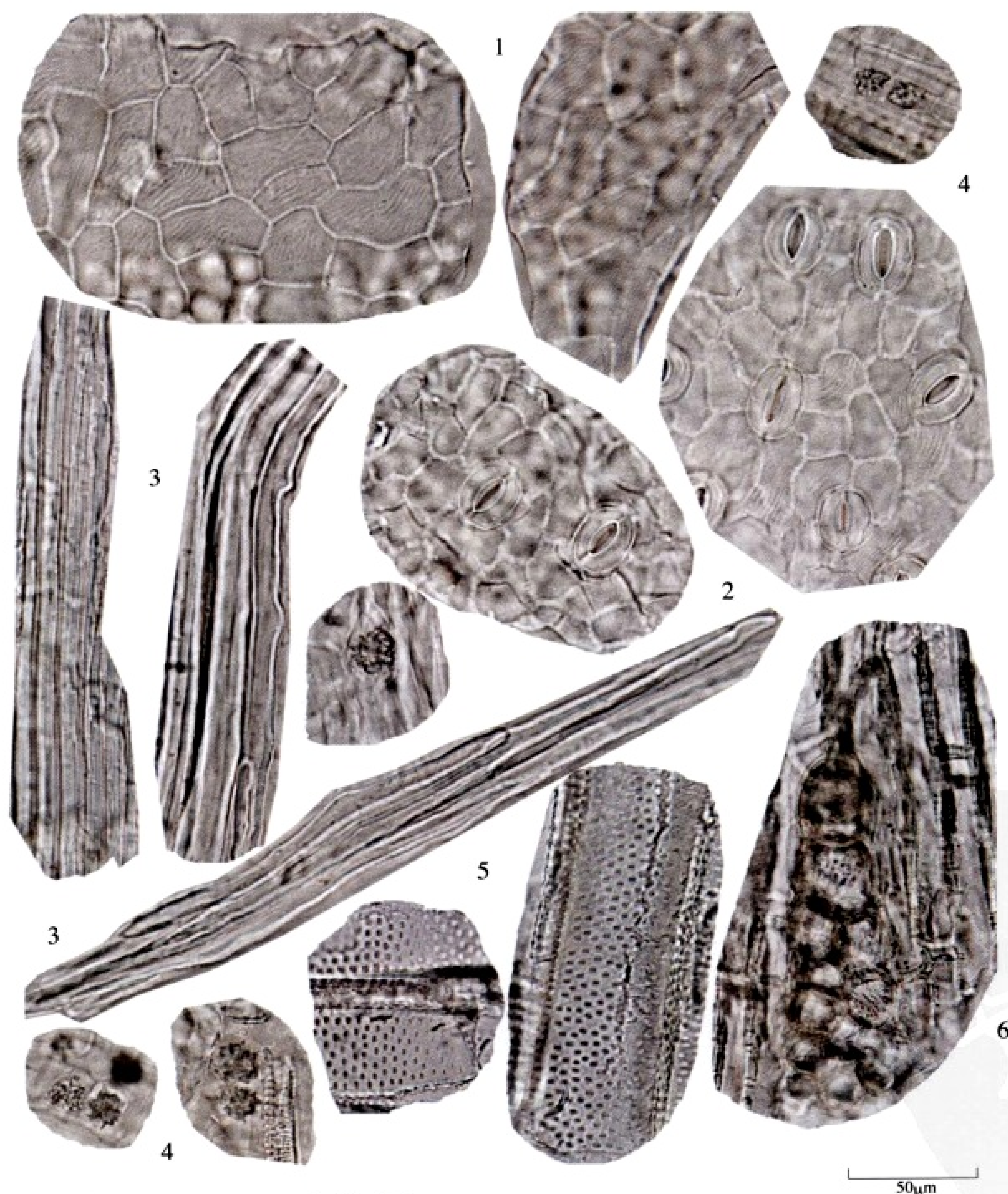


图1　苦木（*Picrasma quassioides* 枝叶）粉末

[Fig1　Powder of branch and leaf from *Picrasma quassioides*]

1. 叶上表皮细胞（Upper epidermal cells of leaf）　2. 叶下表皮细胞（Lower epidermal cells of leaf）　3. 纤维（Fibres）　4. 草酸钙簇晶（Clusters of calcium oxalate）　5. 导管（Vessels）　6. 射线细胞（Ray cells）

注：《中国药典》收载苦木为枝叶，经调查商品全部为心材。本实验材料采于华南植物所。

苦 地 丁
Kudiding
HERBA CORYDALIS BUNGEANAE



图1　苦地丁（*Corydalis bungeana* 茎）横切面
[Fig1　Transverse section of stem from *Corydalis bungeana*]

本品为罂粟科植物紫堇*Corydalis bungeana* Turcz. 的干燥全草。

[显微特征]　**本品茎横切面**：表皮细胞1列，类圆形，外被厚的角质层；气孔下陷。皮层薄壁细胞形状不规则，棱脊处厚角细胞7～10列。中柱鞘为1～2列纤维，环状排列，棱脊处纤维排成半月状。外韧型维管束位于棱脊处，韧皮部狭窄；木质部由导管、管胞、纤维和薄壁细胞组成。髓部较宽广，中央具有大空腔。（图1～3）

Transverse section of stem: Epidermis consisting of 1 layer of cells, subrounded, covered with thick cuticle; stomata sunken. Parenchymatous cells of cortex irregular, occurring 7～10 layers of collenchymatous cells in ridges. Pericycle fibres in a ring, 1～2 layers of cells; fibres in ridges arranged in crescent shape. Collateral vascular bundles occurring at ridges, phloem narrow, xylem composed of vessels, tracheids, fibres and parenchymatous cells. Pith relatively large, hollowed in the centre.（Fig 1～3）

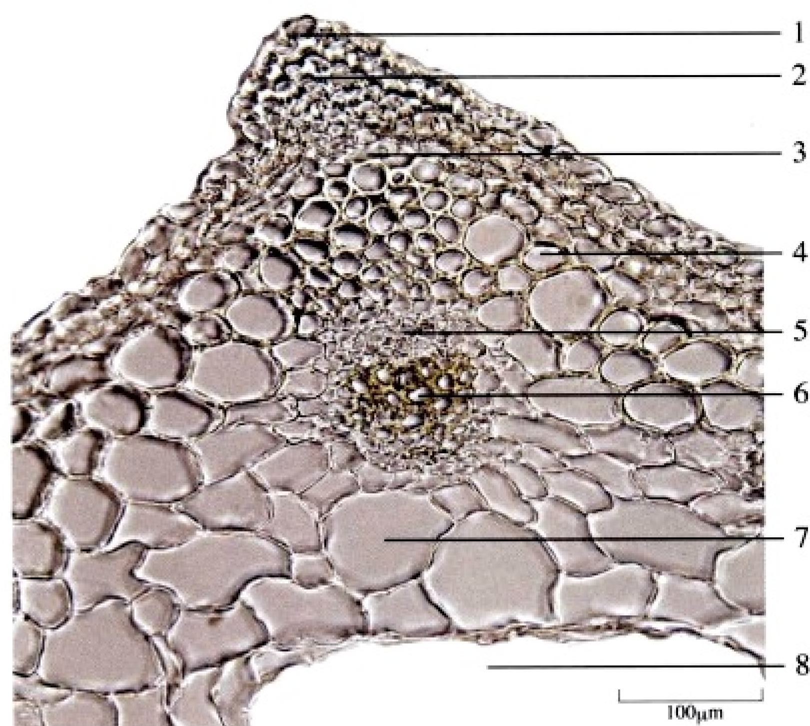


图2　局部组织放大
[Fig2　Partial tissue magnified]
1. 表皮（Epidermis）　2.厚角组织（Collenchyma）　3. 皮层（Cortex）　4. 中柱鞘纤维（Pericycle fibres）　5. 韧皮部（Phloem）　6. 木质部（Xylem）　7. 髓（Pith）　8. 髓腔（Hollowed pith）



图3　示气孔
[Fig3　Showing stomata]

苘 麻 子

Qingmazi

SEMEN ABUTILI

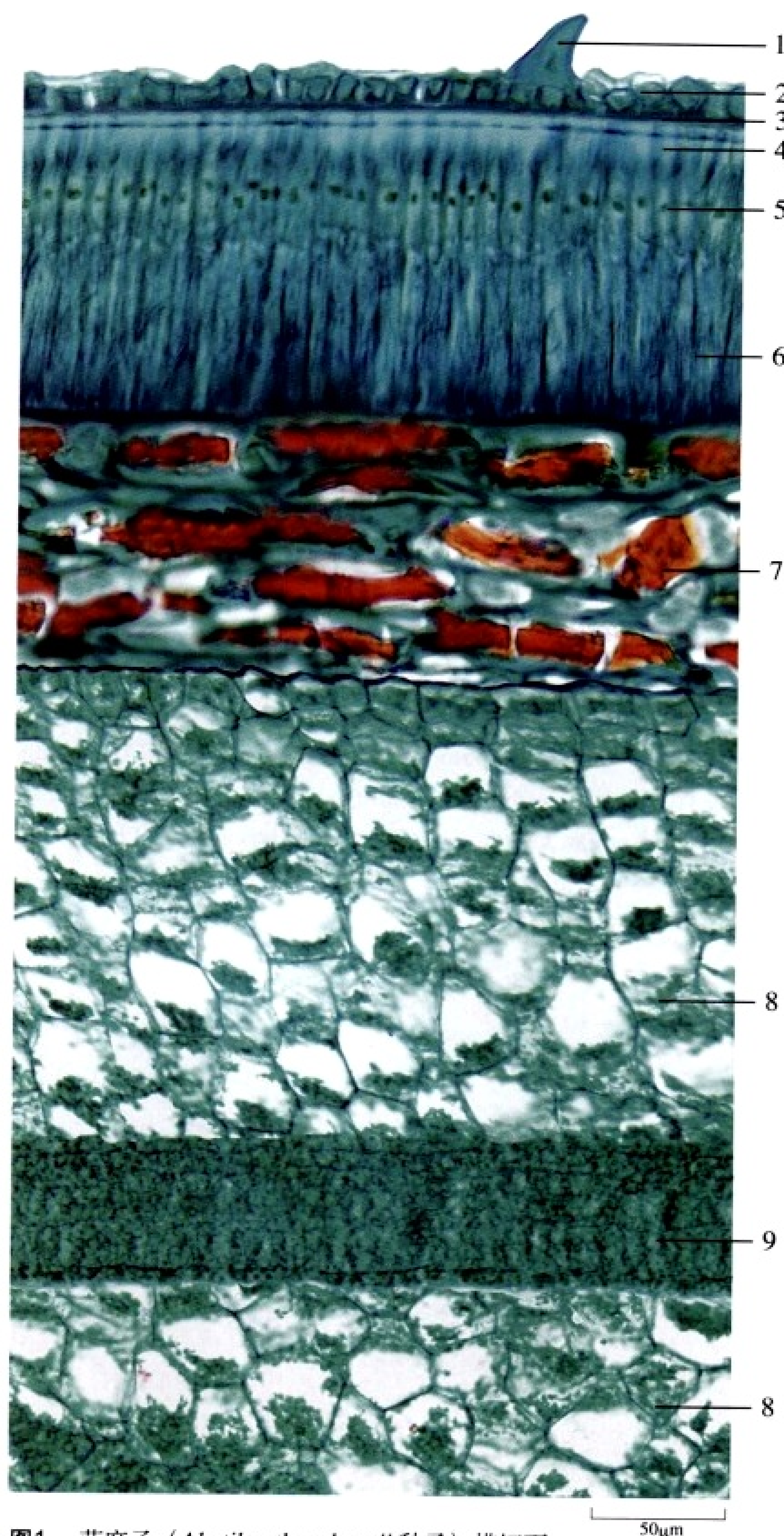


图1 苘麻子（*Abutilon theophrastii* 种子）横切面

[Fig1 Transverse section of seed from *Abutilon theophrastii*]

1. 非腺毛（Non-glandular hair） 2. 表皮细胞（Epidermal cells） 3. 下皮细胞（Hypodermal cells） 4. 光辉带（Light line） 5. 球状结晶（Globular crystals） 6. 栅状细胞（Palisade cells） 7. 色素层（Pigment zone） 8. 胚乳（Endosperm） 9. 子叶（Cotyledon）

本品为锦葵科植物苘麻*Abutilon theophrastii* Medic. 的干燥成熟种子。

[显微特征]　本品横切面：表皮细胞1列，扁长方形，有的分化成单细胞非腺毛。下皮细胞1列，略径向延长。栅状细胞1列，长柱形，长约至88μm，壁极厚，上部可见线形胞腔,其末端膨大，内含细小球状结晶。色素层4～5列细胞，含黄棕色或红棕色物。胚乳及子叶细胞含脂肪油和糊粉粒，子叶细胞还含少数细小草酸钙簇晶。（图1）

Transverse section: Epidermal cells 1 layer, flattened-rectangular, sometimes differentiated to unicellular non-glandular hairs. Hypodermal cells 1 layer, slightly radially prolated. Palisade cells 1 row, cylindrical, up to about 88μm long, with heavily thickened walls, linear lumina visible at the upper part, the terminal end expended, containing small globular crystals. Pigment zone consisting of 4～5 layers of cells, containing yellowish-brown or reddish-brown contents. Cells of endosperm and cotyledons containing fatty oil droplets and aleurone grains, cells of cotyledons also containing a few of fine clusters of calcium oxalate. (Fig 1)

枇　杷　叶

Pipaye

FOLIUM ERIOBOTRYAE

本品为蔷薇科植物枇杷*Eriobotrya japonica*（Thunb.）Lindl. 的干燥叶。

[显微特征]　本品横切面：上表皮细胞扁方形，外被厚角质层；下表皮有多数单细胞非腺毛，常弯曲，近主脉处多弯成人字形，气孔可见。栅栏组织为3～4列细胞，海绵组织疏松，均含草酸钙方晶及簇晶。主脉维管束外韧型，近环状；中柱鞘纤维束排列成不连续的环，壁木化，其周围薄壁细胞含草酸钙方晶，形成晶纤维；薄壁组织中散有黏液细胞，并含草酸钙方晶。（图1）

Transverse section: Upper epidermal cells rectangular, covered with thick cuticle; lower epidermis bearing numerous unicellular non-glandular hairs, usually curved into V-form near midrib, stomata visible. Palisade tissue 3～4 layers of cells, spongy tissue loose, all containing prisms and clusters of calcium oxalate. Vascular bundle of midrib collateral, nearly ringed; pericycle fibre bundles arranged in an interrupted ring, with lignified walls, surrounded by parenchymatous cells containing prisms, forming crystal fibres; mucilage cells and prisms of calcium oxalate scattered in parenchyma.（Fig 1）

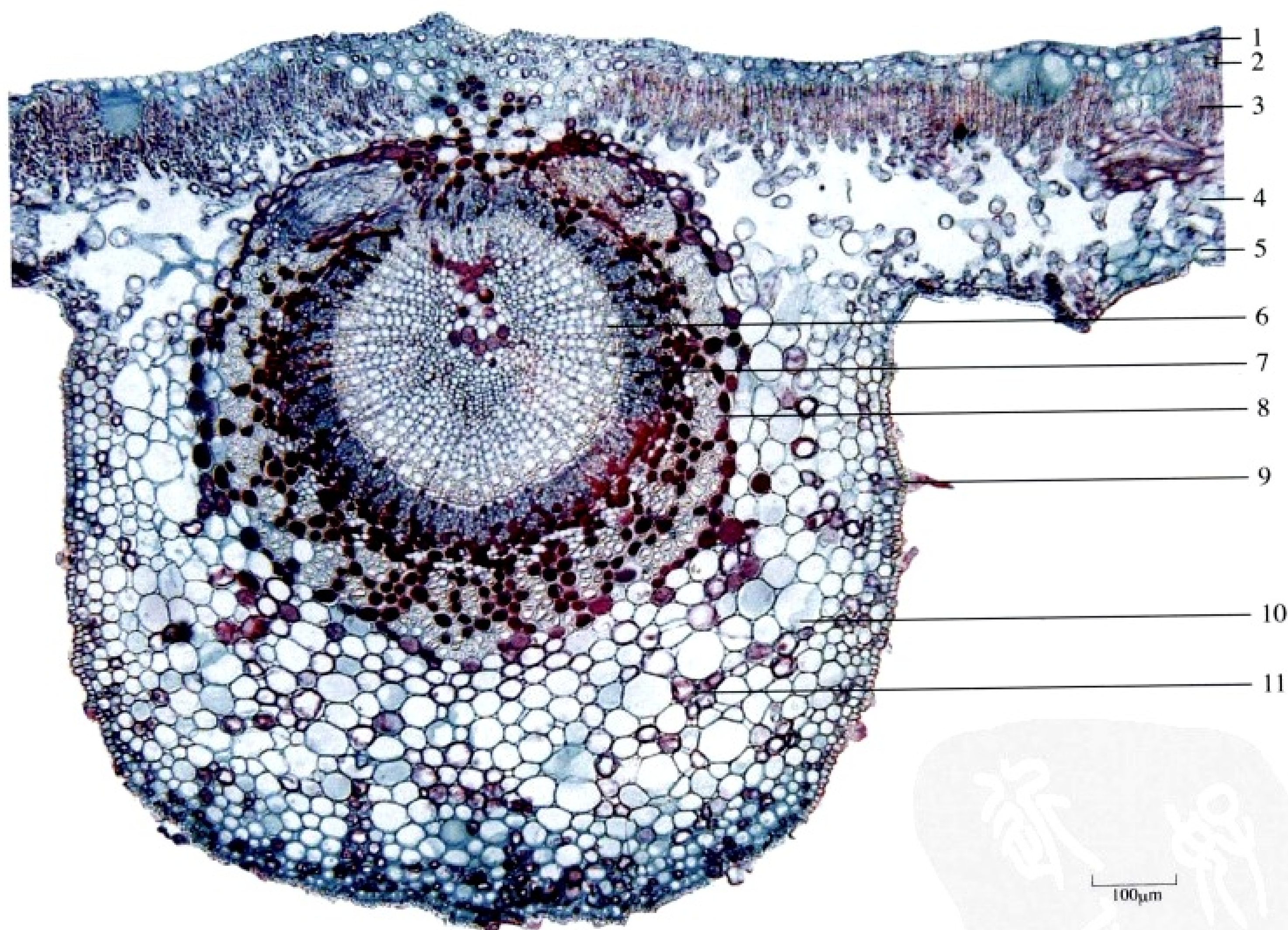


图1　枇杷叶（*Eriobotrya japonica* 叶）横切面

[Fig1　Transverse section of leaf from *Eriobotrya japonica*]

1. 上表皮（Upper epidermis）　2. 草酸钙方晶（prisms of calcium oxalate）　3. 栅栏组织（Palisade tissue）　4. 海绵组织（Spongy tissue）　5. 下表皮（Lower epidermis）　6. 主脉维管束-木质部（Vascular bundle of midrib-Xylem）　7. 主脉维管束-韧皮部（Vascular bundle of midrib-Phloem）　8. 中柱鞘纤维束（Pericyclic fibre bundles）　9. 非腺毛（Non-glandular hairs）　10. 薄壁组织（Parenchyma）　11. 黏液细胞（Mucilaginous cells）

板 蓝 根

Banlangen

RADIX ISATIDIS

本品为十字花科植物菘蓝*Isatis indigotica* Fort.的干燥根。

[显微特征]　本品横切面：木栓层为数列细胞；栓内层狭。韧皮部宽广，射线明显。形成层成环。木质部导管黄色，类圆形，直径约至80μm；有木纤维束。薄壁细胞含淀粉粒（图1、2）。

Transverse section: Cork consisting of several rows of cells. Phelloderm narrow. Phloem broad, rays distinct. Cambium in a ring. Xylem vessels yellow, subrounded, up to 80μm in diameter; xylary fibres in bundles. Parenchymatous cells containing starch granules.（Fig 1, 2）

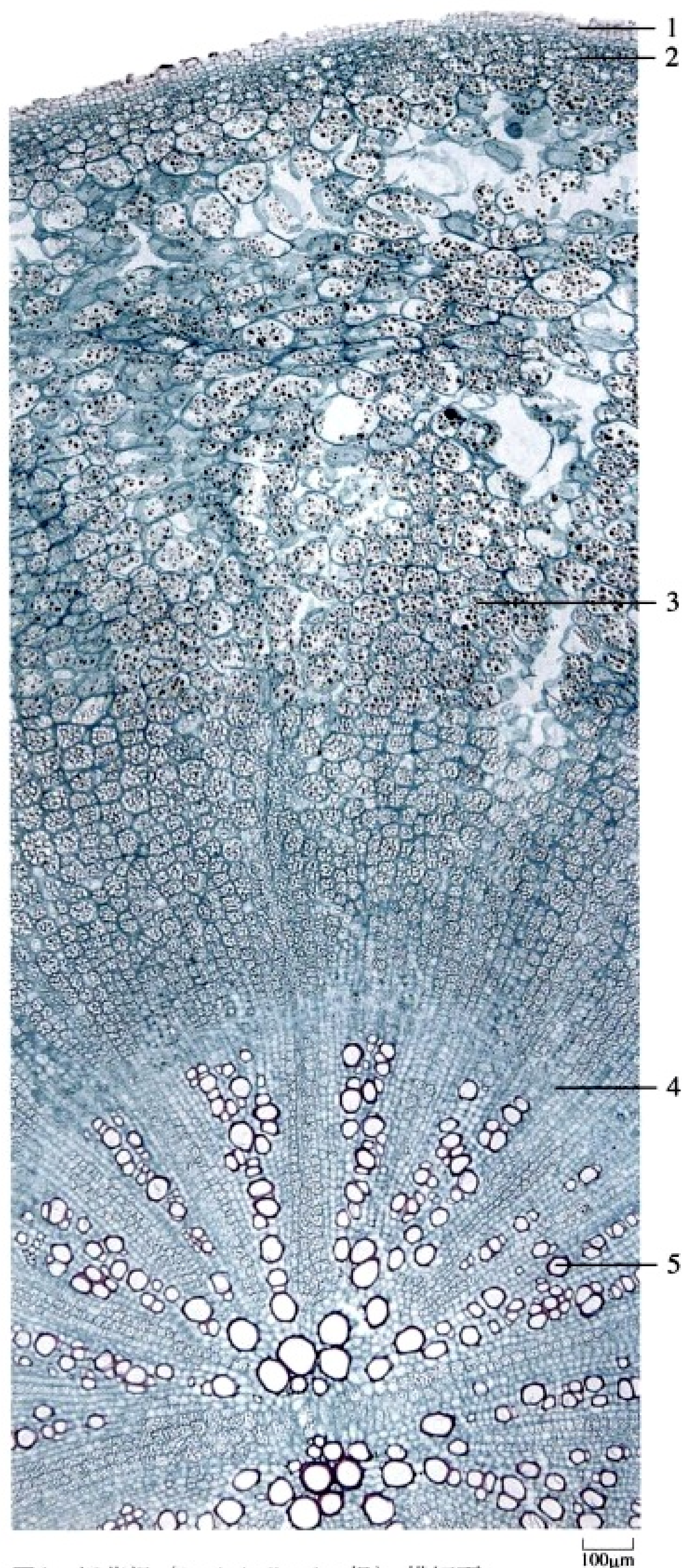


图1　板蓝根（*Isatis indigotica* 根）横切面

[Fig1　Transverse section of root from *Isatis indigotica*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮部（Phloem）　4. 形成层（Cambium）　5. 木质部（Xylem）

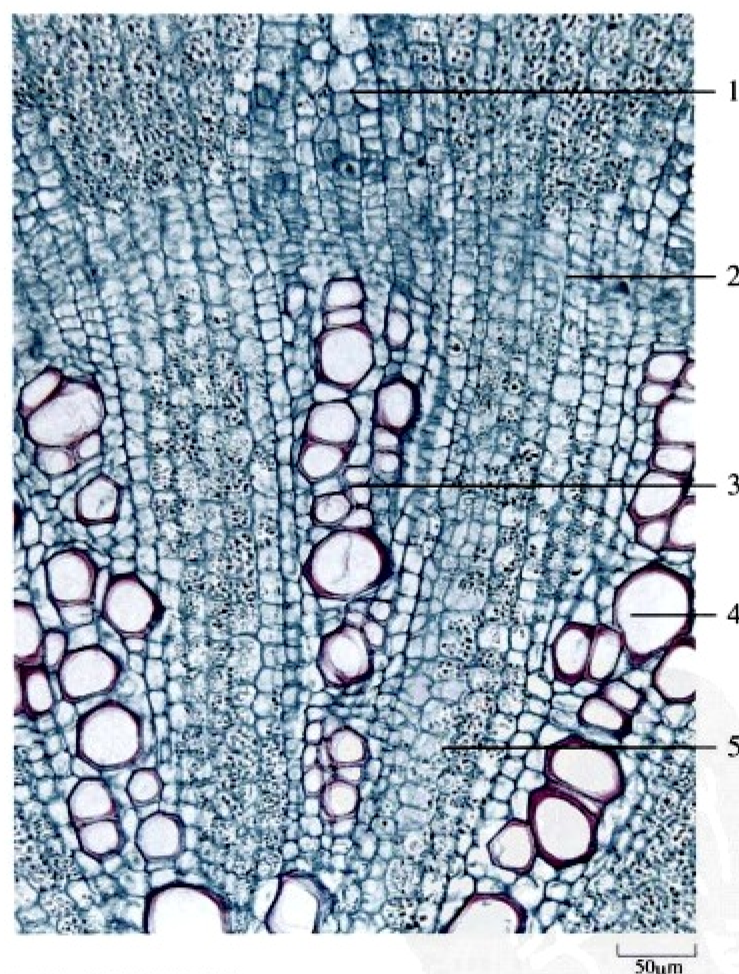


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 筛管群（Sieve tube groups）　2. 形成层（Cambium）　3. 木纤维（Xylem fibres）　4. 导管（Vessels）　5. 木射线（Xylem rays）

松 花 粉
Songhuafen
POLLEN PINI

本品为松科植物马尾松*Pinus massoniana* Lamb.、油松*Pinus tabulaeformis* Carr. 或同属数种植物的干燥花粉。

[显微特征] 本品粉末：淡黄色。花粉粒椭圆形，长45～55μm，直径29～40μm，表面光滑，两侧各有一膨大的气囊，气囊有明显的网状纹理，网眼多角形。（图1）

Powder: Pale yellow. Pollen grains elliptical, 45～55μm long, 29～40 μm in diameter, surface smooth, bearing an inflated air sac on both sides respectively, the walls of air sacs with distinct reticulate striations, the meshes polygonal. (Fig 1)



图1　松花粉（*Pinus massoniana* 花粉）粉末
[Fig1　Powder of pollen from *Pinus massoniana*]

刺　五　加

Ciwujia

RADIX ET RHIZOMA SEU CAULIS ACANTHOPANACIS SENTICOSI

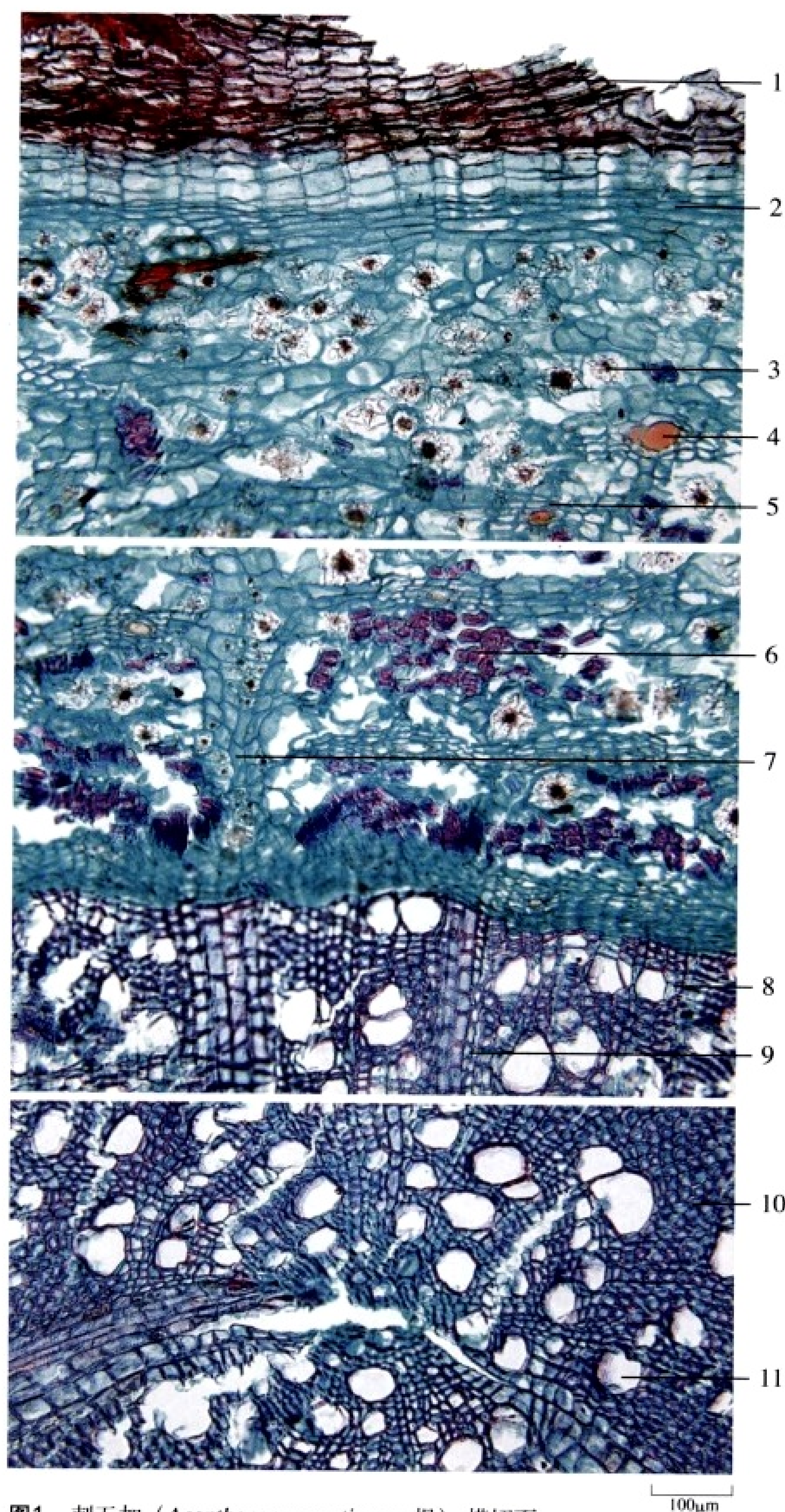


图1　刺五加（*Acanthopanax senticosus* 根）横切面

[Fig1　Transverse section of root from *Acanthopanax senticosus*]

1. 木栓层（Cork layer）　2. 栓内层（Phelloderm）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 分泌道（Secretory canals）　5. 韧皮部（Phloem）　6. 韧皮纤维束（Phloem fibres）　7. 韧皮射线（Phloem rays）　8. 木质部（Xylem）　9. 木射线（Xylem rays）　10. 木纤维（Xylem fibres）　11. 导管（Vessels）

本品为五加科植物刺五加 *Acanthopanax senticosus*（Rupr. et Maxim.）Harms的干燥根、根茎或茎。

[显微特征]　本品根横切面：木栓细胞数十列。栓内层菲薄，散有分泌道；薄壁细胞大多含草酸钙簇晶，直径11～64μm。韧皮部外侧散有较多纤维束，向内渐稀少；分泌道类圆形或椭圆形，径向径25～51μm，切向径48～97μm；薄壁细胞含簇晶。形成层成环。木质部占大部分，射线宽1～3列细胞；导管壁较薄，多数个相聚；木纤维发达。（图1）

根茎横切面：韧皮部纤维束较根为多；有髓。

茎横切面：髓部较发达。

Transverse section of root: Cork cells of 10 or more layers. Phelloderm thin, scattered with secretory canals; most of parenchymatous cells containing clusters of calcium oxalate, 11～64μm in diameter. The outside of phloem scattered with more fibre bundles, lessening inwards; secretory canals subrounded or elliptical, 25～51μm long radially, 48～97μm long tangentially; parenchymatous cells containing clusters. Cambium in a ring. The majority of root occupied by xylem, rays 1～3 rows of cells wide; vessels relatively thin-walled, mostly several grouped; xylem fibres well developed. (Fig 1)

Transverse section of rhizome: Fibre bundles in phloem much more than those in root; pith visible.

Transverse section of stem: Pith well developed.

郁　金

Yujin

RADIX CURCUMAE

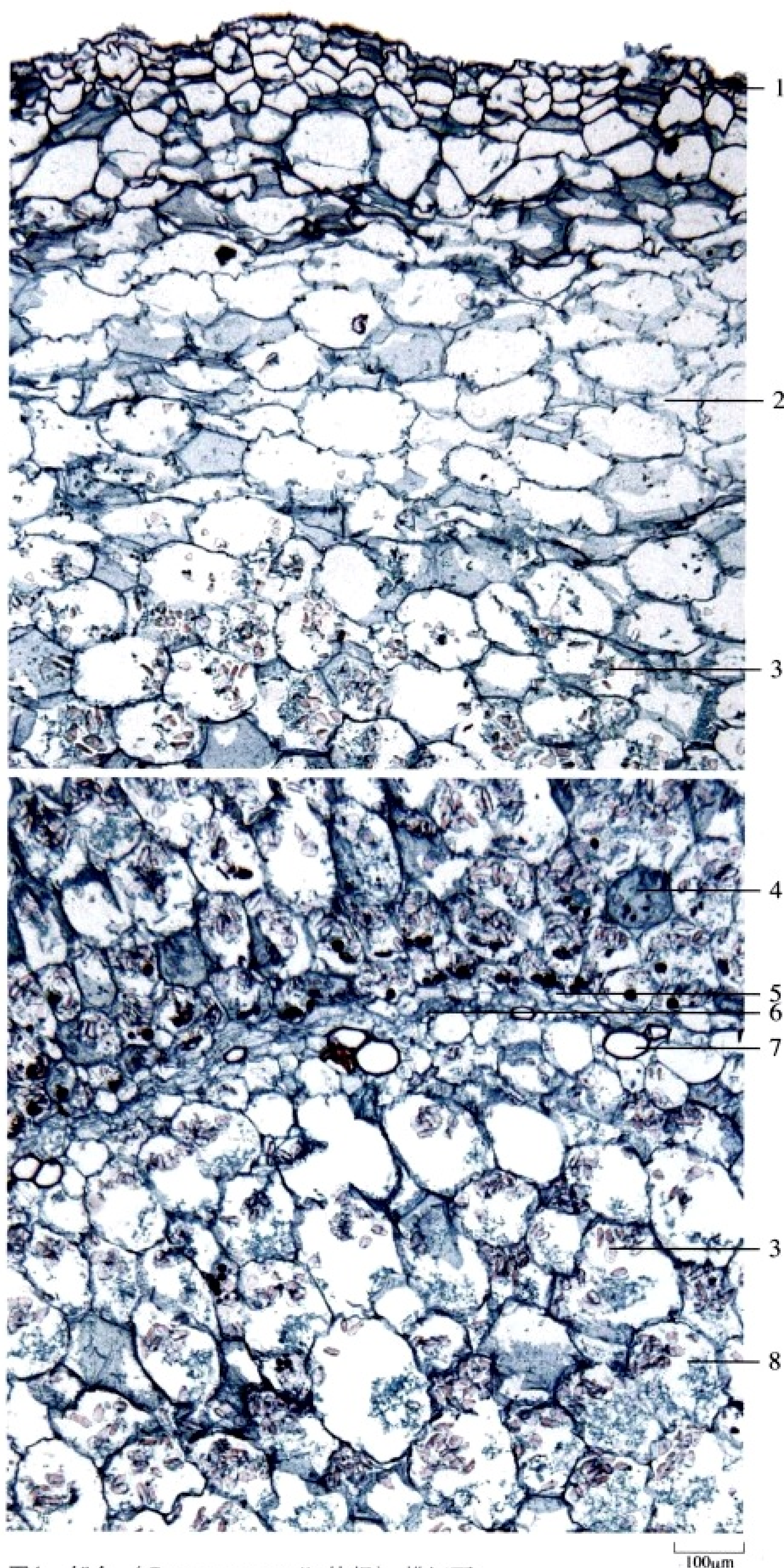


图1　郁金（*Curcuma wenyujin* 块根）横切面

[Fig1　Transverse section of root tuber from *Curcuma wenyujin*]

1. 根被（Velamen）　2. 皮层（Cortex）　3. 淀粉粒（Starch granules）　4. 油细胞（Oil cells）　5. 内皮层（Endodermis）　6. 韧皮部（Phloem）　7. 木质部（Xylem）　8. 髓（Pith）

本品为姜科植物温郁金*Curcuma wenyujin* Y. H. Chen et C. Ling、姜黄*Curcuma longa* L.、广西莪术*Curcuma kwangsiensis* S. G. Lee et C. F. Liang或蓬莪术*Curcuma phaeocaulis* Val. 的干燥块根。

[显微特征]　本品横切面：温郁金（*Curcuma wenyujin*）表皮细胞有时残存，外壁稍厚。根被狭窄，为4～8列细胞，壁薄，略呈波状，排列整齐。皮层宽约为根直径的1/2，油细胞难察见，内皮层明显。中柱韧皮部束与木质部束各40～55个，间隔排列；木质部束导管2～4个，并有微木化的纤维，导管多角形，壁薄，直径20～90μm。薄壁细胞中可见糊化淀粉粒。（图1）

Transverse section: Wenyujin （*Curcuma wenyujin*）: Epidermal cells sometimes remaining, the outer walls slightly thickened. Velamen narrow, composed of 4～8 layers of cells with slightly sinuous and thin walls, regularly arranged. Cortex 1/2 as wide as the diameter of the root, oil cells poorly visible, endodermis distinct. In stele, phloem bundles and xylem bundles 40～55, respectively, arranged alternatively; each xylem bundle with 2～4 vessels and slightly lignified fibres, vessels polygonal, thin walled, 20～90μm in diameter. Gelatinized starch granules in parenchymatous cells visible. （Fig 1）

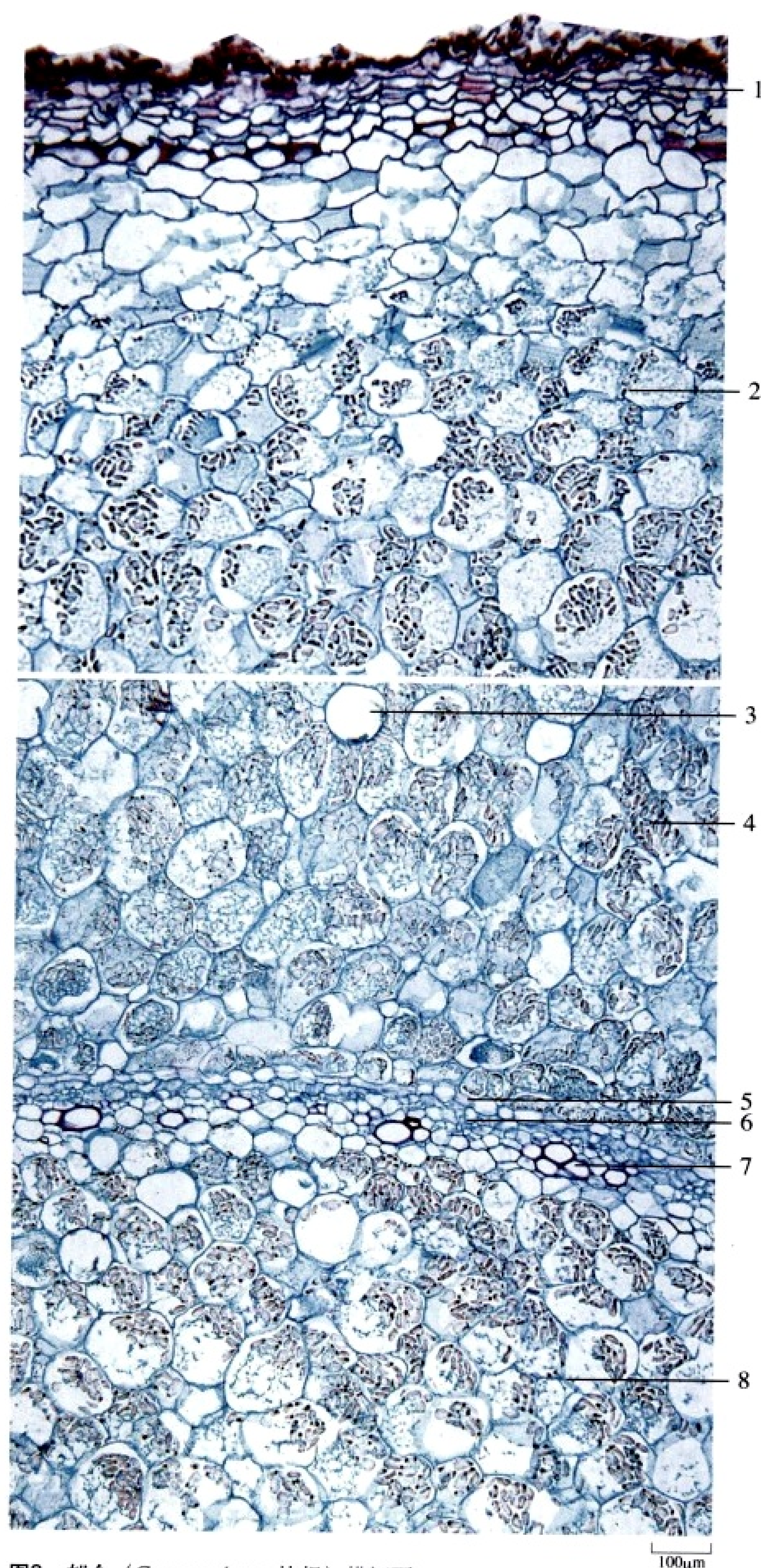


图2 郁金（*Curcuma longa* 块根）横切面

[Fig2 Transverse section of root tuber from *Curcuma longa*]

1. 根被（Velamen） 2. 皮层（Cortex） 3. 油细胞（Oil cells） 4. 淀粉粒（Starch granules） 5. 内皮层（Endodermis） 6. 韧皮部（Phloem） 7. 木质部（Xylem） 8. 髓（Pith）

黄丝郁金（*Curcuma longa*） 根被最内层细胞壁增厚。中柱韧皮部束与木质部束各22～29个，间隔排列；有的木质部导管与纤维连接成环。油细胞众多。薄壁组织中随处散有色素细胞。（图2）

Huangsiyujin （*Curcuma longa*）: Walls of the innermost layer of velamen cells thickened. Phloem bundles and xylem bundles 22～29, respectively, arranged alternatively; some xylem vessels and fibres arranged in a continuous ring, oil cells numerous, pigment cells scattered throughout parenchyma. （Fig 2）

桂郁金（*Curcuma kwangsiensis*） 根被细胞壁偶有增厚，根被内有1～2列厚壁细胞，成环，层纹明显。中柱韧皮部束与木质部束各42～48个，间隔排列；导管类圆形，直径可达160 μm。

Guiyujin （*Curcuma kwangsiensis*）: Walls of velamen cells occasionally thickened, the inner side of velamen showing 1～2 layers of sclerenchymatous cells arranged in a ring, with distinct striations. Phloem bundles and xylem bundles 42～48, respectively, arranged alternatively; vessels subrounded, up to 160μm in diameter.

绿丝郁金（*Curcuma phaeocaulis*） 根被细胞壁无增厚。中柱外侧的皮层处常有色素细胞。韧皮部皱缩，木质部束64～72个，导管扁圆形。

Lüsiyujin （*Curcuma phaeocaulis*）: Velamen cells thin walled. Cortex at the outside of stele frequently exhibiting pigment cells. Phloem bundles shrivelled, xylem bundles 64～72, vessels flat rounded.

罗布麻叶

Luobumaye

FOLIUM APOCYNI VENETI

本品为夹竹桃科植物罗布麻*Apocynum venetum* L. 的干燥叶。

[显微特征]　本品表面观：上下表皮细胞多角形，垂周壁平直，表面有颗粒状角质纹理；气孔平轴式。（图1）

Surface view of leaf: Upper and lower epidermal cells polygonal, anticlinal walls straight, with granular cuticular striations on surfaces; stomata paracytic.（Fig 1）

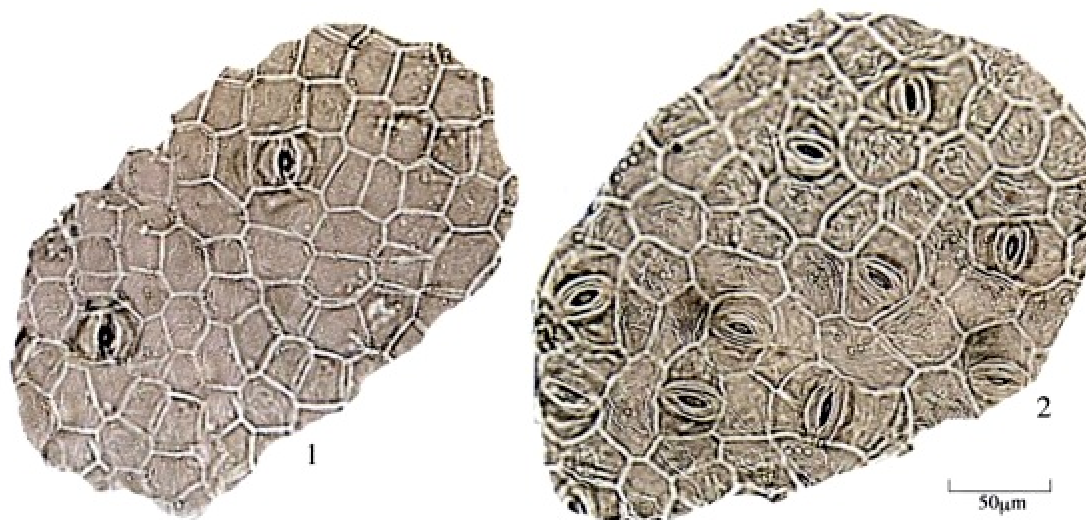


图1　罗布麻叶（*Apocynum venetum* 叶）表面观

[Fig 1　Surface view of leaf from *Apocynum venetum*]

1. 上表皮细胞（Upper epidermal cells）　2. 下表皮细胞（Lower epidermal cells）

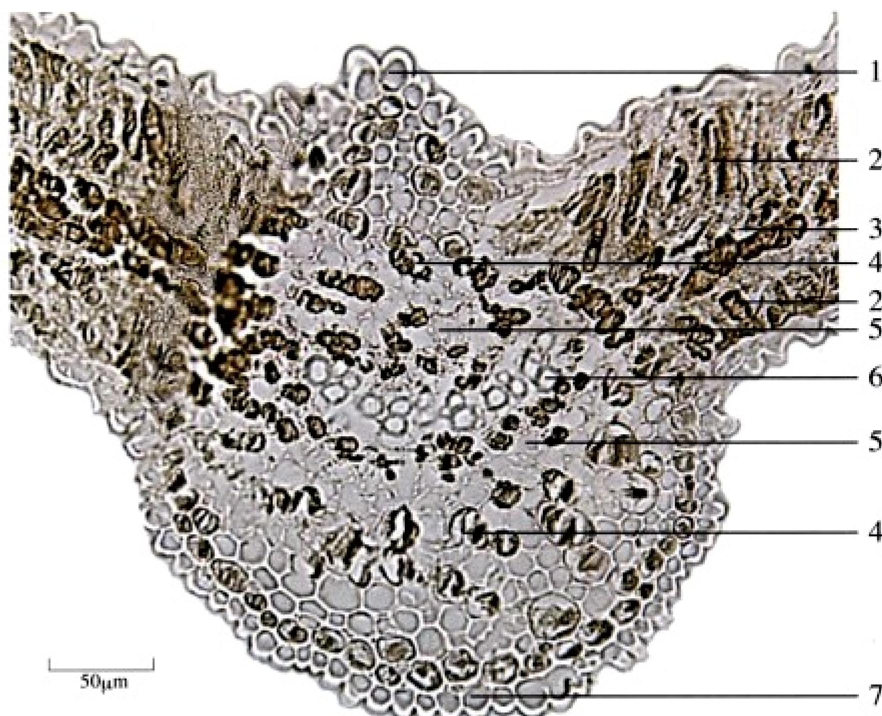


图2　罗布麻叶（*Apocynum venetum* 叶）横切面

[Fig2　Transverse section of leaf from *Apocynum venetum*]

1. 上表皮（Upper epidermis）　2. 栅栏组织（Palisade tissue）　3. 海绵组织（Spongy tissue）　4. 乳汁管（Laticiferous tubes）　5. 韧皮部（Phloem）　6. 木质部（Xylem）　7. 下表皮（Lower epidermis）

本品横切面：表皮细胞扁平，外壁突起。叶两面均具栅栏组织，上表皮内栅栏细胞多为2列，下表皮内多为1列，细胞极短，海绵组织细胞2～4列，含棕色物。主脉维管束双韧型，维管束周围及韧皮部散有乳汁管。（图2）

Transverse section: Epidermal cells flattened, with convex outer walls. Mesophyll consisting of upper and lower palisade tissues, usually with 2 layers of palisade cells in upper epidermis, and 1 layer in lower epidermis, the cells very short; spongy tissue of 2～4 layers of cells, containing brown contents. Vascular bundle of midrib bicollateral, laticiferous tubes scattered around the bundle and in phloem.（Fig 2）

罗 汉 果

Luohanguo

FRUCTUS MOMORDICAE

本品为葫芦科植物罗汉果 *Momordica grosvenori* Swingle 的干燥果实。

[显微特征]　本品粉末：棕褐色。果皮石细胞大多成群，黄色，方形或卵圆形，直径7～38μm，壁厚，孔沟明显。种皮石细胞类长方形或不规则形，壁薄，具纹孔。纤维长梭形，直径16～42μm，胞腔较大，壁孔明显。可见梯纹和螺纹导管。薄壁细胞不规则形，具纹孔。（图1）

Powder: Brown. Stone cells of pericarp mostly grouped, yellow, square or ovoid, 7～38 μm in diameter, walls thick, pit canals obvious. Stone cells of testa subrectangular or irregular, thin-walled, and with pits. Fibres long-fusiform, 16～42 μm in diameter, lumina relatively big, and pit canals obvious. Vessels scalariform and spiral, parenchymatous cells irregular and pitted. (Fig 1)



图1　罗汉果（*Momordica grosvenori* 果实）粉末

[Fig1　Powder of fruit from *Momordica grosvenori*]

1. 果皮石细胞（Stone cells of pericarp）　2. 种皮石细胞（Stone cells of testa）　3. 纤维（Fibres）　4. 导管（Vessels）　5. 薄壁细胞（Parenchymatous cells）

垂 盆 草

Chuipencao

HERBA SEDI

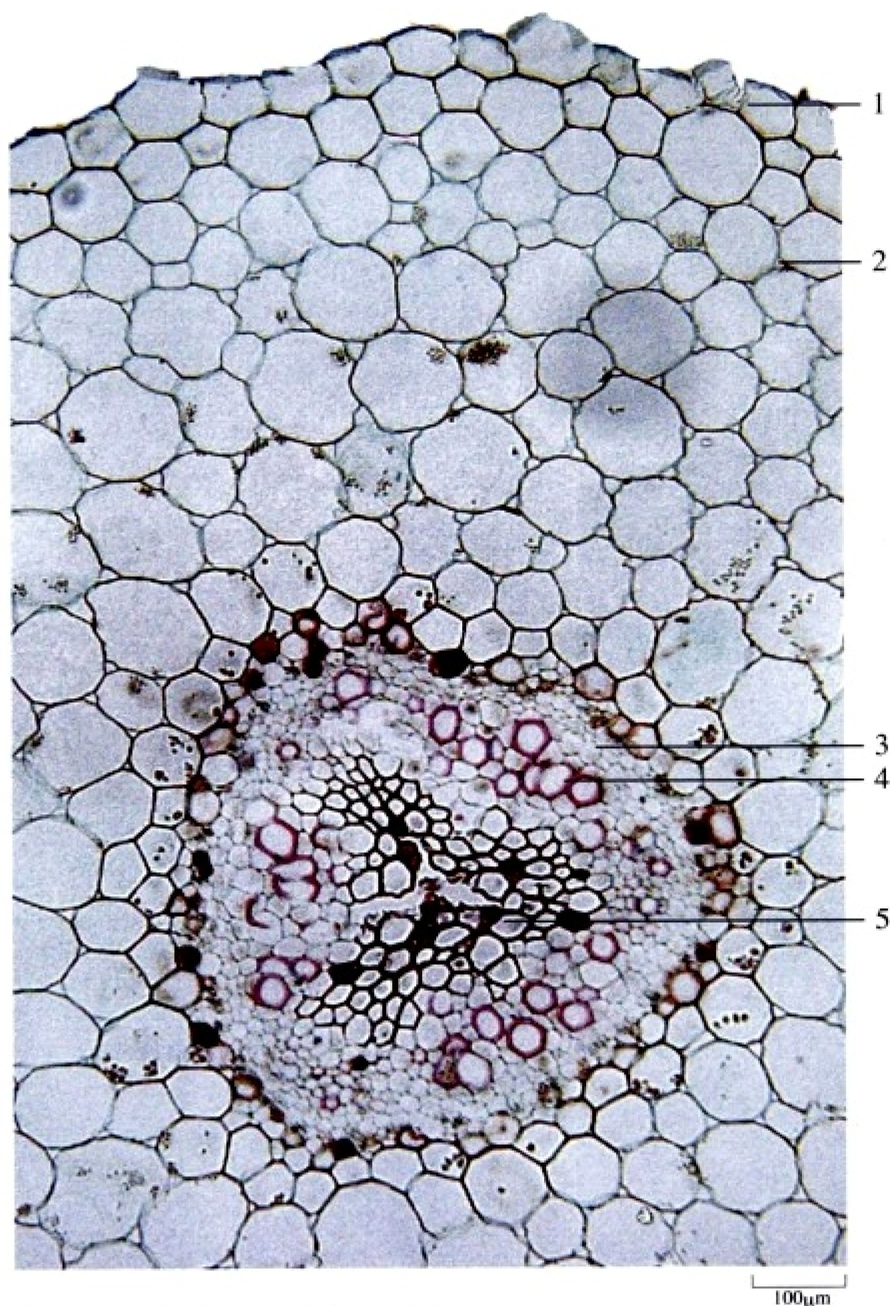


图1 垂盆草（*Sedum sarmentosum* 新鲜茎）横切面

[Fig1 Transverse section of fresh stem from *Sedum sarmentosum*]

1. 表皮（Epidermis） 2. 皮层（Cortex） 3. 韧皮部（Phloem） 4. 木质部（Xylem） 5. 髓（Pith）

本品为景天科植物垂盆草 *Sedum sarmentosum* Bunge 的新鲜或干燥全草。

[显微特征] **本品茎的横切面**：表皮细胞长方形，外壁稍增厚。皮层约有10余列薄壁细胞。中柱小，维管束外韧型，导管类圆形。髓部呈三角状，细胞多角形，壁甚厚，非木化。紧靠韧皮部及髓部细胞中含红棕色分泌物。(图1)

Transverse section of stem: Epidermal cells rectangular, outer walls thickened. Cortex of about 10 layers of parenchymatous cells. Vascular cylinder small, vascular bundles collateral, vessels subrounded. Pith triangular, cells polygonal, walls strongly thickened and non-lignified. Cells near phloem and in pith containing reddish-brown secretion. (Fig 1)

委 陵 菜

Weilingcai

HERBA POTENTILLAE CHINENSIS

本品为蔷薇科植物委陵菜*Potentilla chinensis* Ser. 的干燥全草。

[显微特征] 本品粉末：灰褐色。非腺毛极多，单细胞，平直或弯曲，有的缠结成团，细长，直径7～37μm，壁厚。草酸钙簇晶存在于叶肉组织中，直径6～65μm，偶有小方晶。木纤维长梭形，直径7～14μm，壁稍厚，孔沟明显。木栓细胞类多角形或扁长方形，内含黄棕色物。（图1）

Powder: Greyish-brown. Non-glandular hairs numerous, unicellular, straight or curved, some twisted into masses, slender, 7～37μm in diameter, with thickened walls. Mesophyll cells containing clusters of calcium oxalate, 6～65μm in diameter, and small prisms occasionally observed. Wood fibres long fusiform, 7～14μm in diameter, walls slightly thickened and pit cannals distinct. Cork cells subpolygonal or flat-rectangular, containing yellowish-brown contents. （Fig 1）



图1 委陵菜（*Potentilla chinensis* 全草）粉末

[Fig1 Powder of herb from *Potentilla chinensis*]

1. 非腺毛（Non-glandular hairs） 2. 草酸钙簇晶（Clusters of calcium oxalate） 3. 木纤维（Xylem fibres） 4. 木栓细胞（Cork cells）

侧 柏 叶

Cebaiye

CACUMEN PLATYCLADI

本品为柏科植物侧柏*Platycladus orientalis*（L.）Franco 的干燥枝梢及叶。

[显微特征]　本品粉末：黄绿色。叶上表皮细胞长方形，壁略厚；下表皮细胞类方形；气孔甚多，凹陷型，保卫细胞较大，侧面观呈哑铃状。薄壁细胞含油滴。纤维细长，直径约18μm。具缘纹孔管胞有时可见。(图1)

Powder: Yellowish-green. Upper epidermal cells of leaf rectangular, with slightly thickened walls. Lower epidermal cells subsquare, stomata numerous, sunken, guard cells relatively large, dumbbell-shaped in lateral view. Parenchymatous cells containing oil droplets. Fibres slender, about 18μm in diameter. Bordered pitted tracheids sometimes present.（Fig 1）



图1　侧柏叶（*Platycladus orientalis* 枝梢及叶）粉末

[Fig1　Powder of the twig and leaf from *Platycladus orientalis*]

1. 叶上表皮细胞及气孔（Upper epidermal cells and stomata of leaf）　2. 叶下表皮细胞及气孔（Lower epidermal cells and stomata of leaf）　3. 薄壁细胞（Parenchymatous cells）　4. 纤维（Fibres）　5. 管胞（Tracheids）

金 荞 麦

Jinqiaomai

RHIZOMA FAGOPYRI DIBOTRYIS

本品为蓼科植物金荞麦*Fagopyrum dibotrys*（D.Don）Hara的干燥根茎。

[显微特征]　本品粉末：淡棕色。淀粉粒甚多，单粒类球形、椭圆形或卵圆形，直径5～48μm，脐点点状、星状、裂缝状或飞鸟状，位于中央或偏于一端，大粒可见层纹；复粒由2～4分粒组成；半复粒可见。木纤维成束，直径10～38μm，具单斜纹孔或十字形纹孔。草酸钙簇晶直径10～62μm。木薄壁细胞类方形、椭圆形，直径28～37μm，长约至100μm，壁稍厚，可见稀疏的纹孔。具缘纹孔及网纹导管直径21～83μm。（图1）

Powder: Brownish. Starch granules fairly abundant, simple granules subspheroidal, ellipsoid or ovoid, 5 ~ 48μm in diameter, hilum pointed, stellate, slit-shaped or flyer-shaped, situated in the centre or close to one end, the larger granules showing striations; compound granules of 2 ~ 4 components; semi-compound granules visible. Xylem fibres in bundles, 10 ~ 38μm in diameter, with simple oblique or cross pits. Clusters of calcium oxalate 10 ~ 62μm in diameter. Parenchymatous cells in xylem subsquare or elliptical, 28 ~ 37μm in diameter, up to 100μm long, walls slightly thickened, sparse pits visible. Bordered pitted and reticulated vessels 21 ~ 83μm in diameter. (Fig 1)

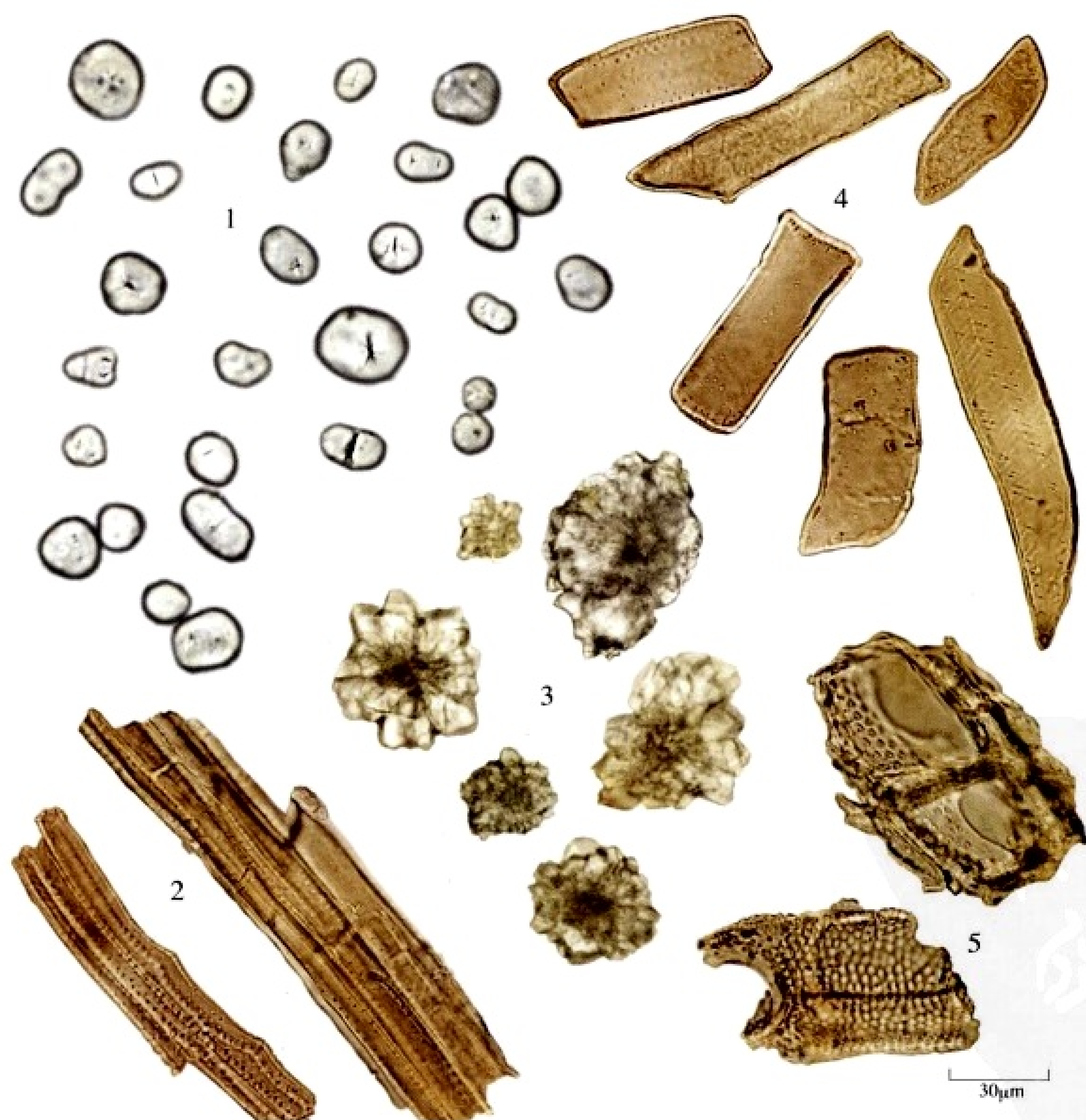


图1　金荞麦（*Fagopyrum dibotrys* 根茎）粉末

[Fig1　Powder of rhizome from *Fagopyrum dibotrys*]

1. 淀粉粒（Starch granules）　2. 木纤维（Xylem fibres）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 木薄壁细胞（Wood parenchymatous cells）　5. 导管（Vessels）

金钱草

Jinqiancao

HERBA LYSIMACHIAE

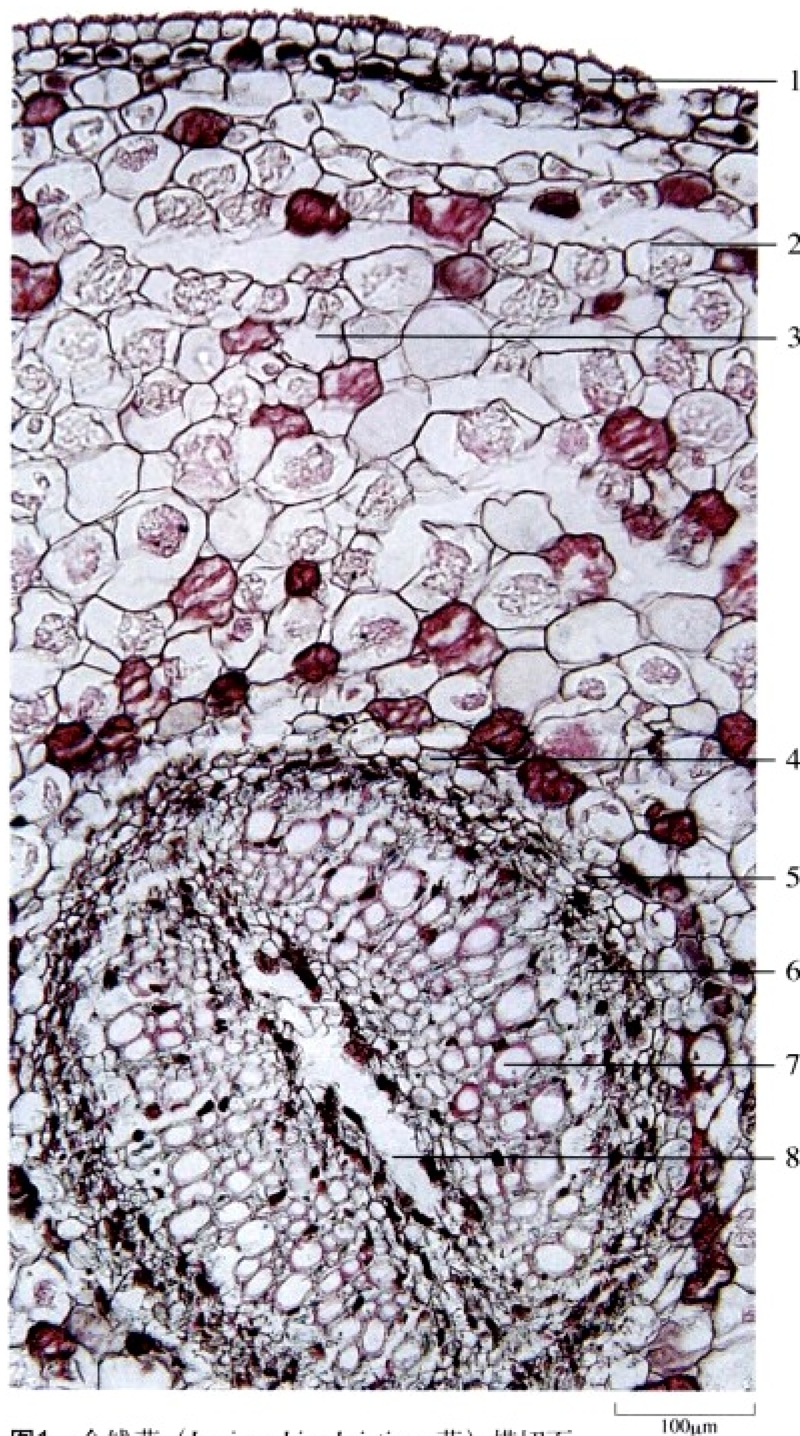


图1　金钱草（*Lysimachia christinae* 茎）横切面

[Fig1　Transverse section of stem from *Lysimachia christinae*]

1. 表皮（Epidermis）　2. 皮层（Cortex）　3. 分泌道（Secretory canals）　4. 内皮层（Endodermis）　5. 中柱鞘纤维（Pericyclic fibres）　6. 韧皮部（Phloem）　7. 木质部（Xylem）　8. 髓（Pith）

本品为报春花科植物过路黄 *Lysimachia christinae* Hance 的干燥全草。

[显微特征]　本品茎的横切面：表皮细胞外被角质层；有时可见腺毛，腺毛头部单细胞，柄部1～2细胞。皮层宽广，细胞中有的含红棕色分泌物；分泌道散在，周围分泌细胞5～10个，内含红棕色块状分泌物；内皮层明显。中柱鞘纤维断续排列成环，壁微木化。韧皮部狭窄。木质部连接成环。髓常成空腔。薄壁细胞含淀粉粒。（图1、2）

Transverse section of stem: Epidermal cells covered with cuticle, glandular hairs sometimes found, with unicellular heads and 1 ~ 2-celled stalks. Cortex broad, sometimes cells containing reddish-brown secretion; secretory canals scattered, surrounded by 5 ~ 10 secretory cells, containing reddish-brown lumpy secretion. Endodermis distinct. Pericyclic fibres arranged in an interrupted ring, walls slightly lignified. Phloem narrow. Xylem ringed. Pith usually hollowed. Parenchymatous cells containing starch granules. (Fig 1,2)

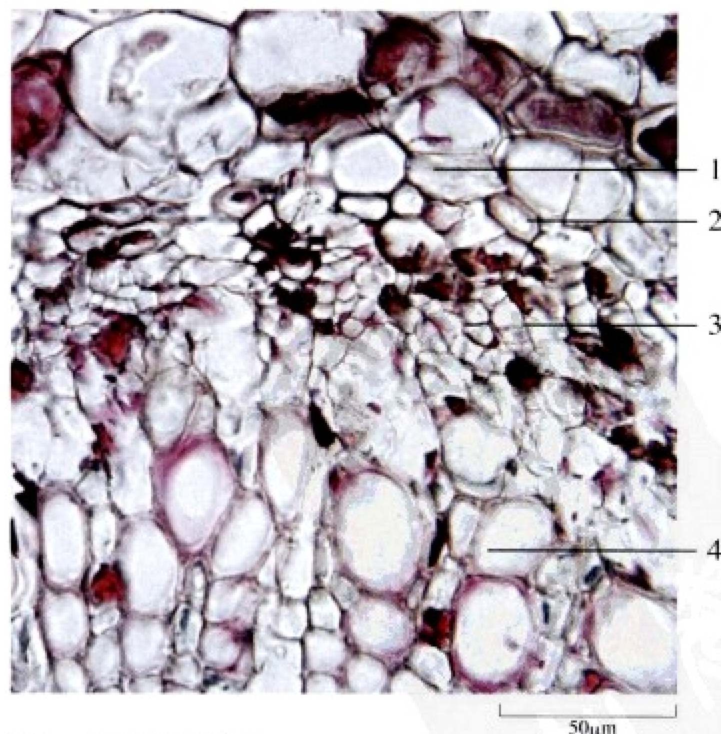


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 内皮层（Endodermis）　2. 中柱鞘纤维（Pericyclic fibres）　3. 筛管群（Sieve tube groups）　4. 导管（Vessels）

本品叶的表面观：腺毛红棕色，头部单细胞，类圆形，直径约25μm，柄单细胞。分泌道散在于叶肉组织内，直径45μm，含红棕色分泌物。可见非腺毛，1～17细胞，平直或弯曲，有的细胞呈缢缩状，长59～1070μm，基部直径13～53μm，表面可见细条纹，胞腔内含黄棕色物。（图3）

Surface view of leaf: Glandular hairs reddish-brown, with subrounded unicellular heads and unicellular stalks, heads about 25μm in diameter. Secretory canals scattered throughout mesophyll, about 45μm in diameter, containing reddish-brown secretion. Sometimes non-glandular hairs visible, 1～17-celled, straight or curved, some cells shrunken, 59～1070μm long, 13～53μm in diameter at the base, finely striated on surface, containing yellowish-brown contents. (Fig 3)



图3　金钱草（*Lysimachia christinae* 叶）表面观

[Fig3　Surface view of leaf from *Lysimachia christinae*]

1. 腺毛（Glandular hairs）　2. 分泌道（Secretory canals）　3. 非腺毛（Non-glandular hairs）　4. 上表皮细胞（Upper epidermal cells）　5. 下表皮细胞（Lower epidermal cells）

金 樱 子

Jinyingzi

FRUCTUS ROSAE LAEVIGATAE

本品为蔷薇科植物金樱子*Rosa laevigata* Michx. 的干燥成熟果实。

[显微特征]　花托壁横切面：外表皮细胞类方形或略径向延长，外壁及侧壁增厚，角质化；表皮上的刺纵切面细胞径向延长。皮层薄壁细胞壁稍厚，纹孔明显，含有油滴，并含橙黄色物，有的含草酸钙方晶及簇晶；纤维束散生于近皮层外侧；维管束多存在于皮层中部及内侧，外韧型，韧皮部外侧有纤维束，导管散在或呈放射状排列。内表皮细胞长方形，内壁增厚，角质化；有木化的非腺毛或具残基。（图1～3）

Transverse section of receptacle wall: Outer epidermal cells subsquare or slightly radially elongated, with thickened and cutinized outer and lateral walls; cells of bristle scars on epidermis radially elongated in longitudinal section. Parenchymatous cells with slightly thickened and distinctly pitted walls, containing oil droplets and orange-yellow contents, some containing prisms and clusters of calcium oxalate; fibre bundles scattered in the outer part of cortex; collateral vascular bundles mostly situated in the central part of cortex, with fibre bundles outside the phloem, vessels scattered or radially arranged. Inner epidermal cells rectangular, with thickened and cutinized inner walls; non-glandular hairs or their remains lignified. (Fig 1～3)

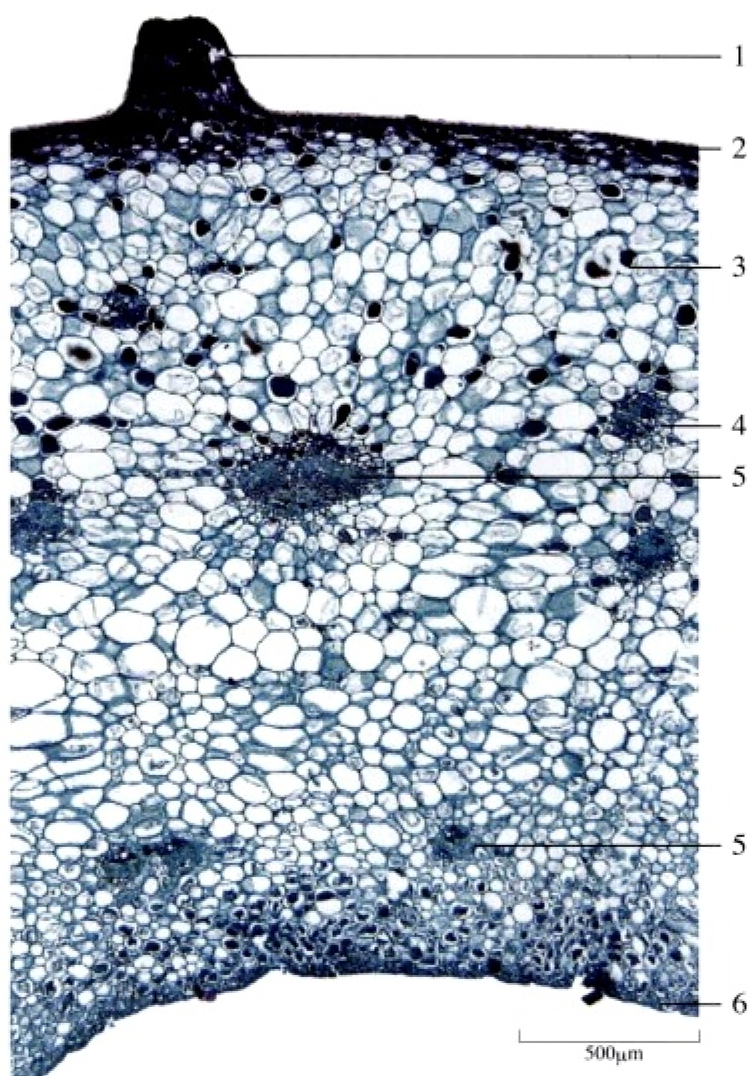


图1　金樱子（*Rosa laevigata* 花托壁）横切面

[Fig1　Transverse section of receptacle wall from *Rosa laevigata*]

1. 刺（Bristle）　2. 外表皮（Outer epidermis）　3. 皮层（Cortex）　4. 纤维束（Fibre bundles）　5. 维管束（Vascular bundles）　6. 内表皮（Inner epidermis）

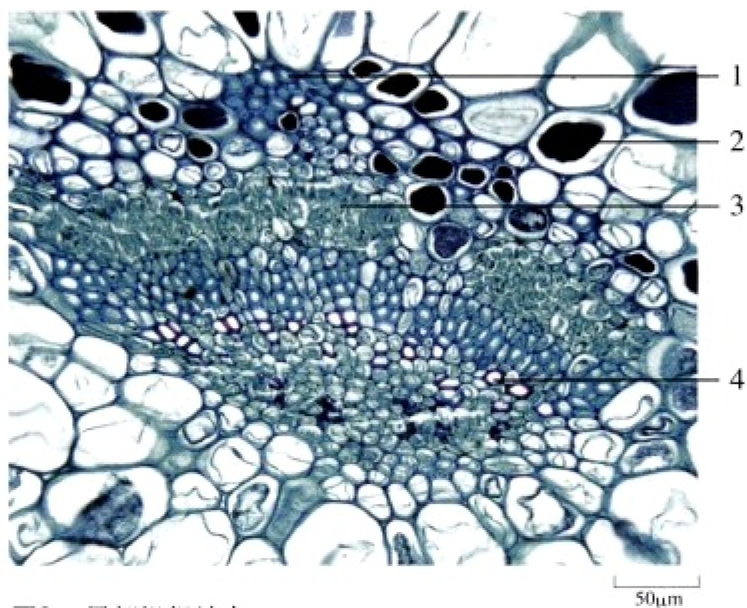


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 纤维束(Fibre bundles)　2. 色素物(Pigment substance)　3. 韧皮部(Phloem)　4. 木质部（Xylem）

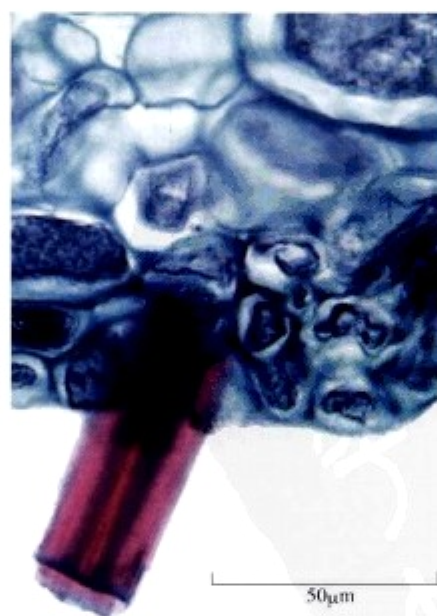


图3　示非腺毛

[Fig3　Showing non-glandular hair]

本品花托粉末：淡肉红色。非腺毛单细胞或多细胞，长505～1836μm，直径16～31μm，壁木化或微木化，表面常有螺旋状条纹，胞腔内含黄棕色物。表皮细胞多角形，壁厚，内含黄棕色物。草酸钙方晶多见，长方形或不规则形，直径16～39μm；簇晶少见，直径27～66μm。螺纹、网纹、环纹及具缘纹孔导管直径8～20μm。薄壁细胞多角形，木化，具纹孔，含黄棕色物。纤维梭形或条形，黄色，长至1071μm，直径16～20μm，壁木化。树脂块不规则形，黄棕色，半透明。（图4）

Powder of receptacle: Pale flesh-coloured. Non-glandular hairs of one or more cells, 505～1836 μm long, 16～31μm in diameter, with lignified or slightly lignified walls and helical striation on surface, lumina containing yellowish-brown contents. Epidermal cells polygonal, thick-walled, containing yellowish-brown contents. Prisms of calcium oxalate abundant, rectangular or irregular, 16～39μm in diameter; clusters less visible, 27～66μm in diameter. Spiral, reticulate, annular and bordered pitted vessels 8～20μm in diameter. Parenchymatous cells polygonal, lignified, pitted and containing yellowish-brown contents. Fibres fusiform or stripy, yellow, up to 1071μm long, 16～20μm in diameter, with lignified walls. Masses of resin irregular in shape, yellowish-brown and translucent. (Fig 4)



图4 金樱子（*Rosa laevigata* 花托）粉末

[Fig4 Powder of receptacle from *Rosa laevigata*]

1. 非腺毛（Non-glandular hairs） 2. 表皮细胞[Epidermal cells （a. 表面观Surface view b. 断面观Sectional view）] 3. 草酸钙簇晶与方晶（Clusters and prisms of calcium oxalate） 4. 导管（Vessels） 5. 薄壁细胞（Parenchymatous cells） 6. 纤维（Fibres） 7. 树脂块（Resin masses）

肿 节 风

Zhongjiefeng

HERBA SARCANDRAE

本品为金粟兰科植物草珊瑚*Sarcandra glabra*（Thunb.）Nakai的干燥全株。

[显微特征]　本品茎的横切面：表皮细胞类长方形或长圆形，外被角质层，外缘呈钝齿状。皮层细胞10余列，外侧为2～3列厚角细胞，内侧薄壁细胞内含棕黄色色素；石细胞单个或成群散在。中柱鞘纤维束呈新月形，断续环列，木化。韧皮部狭窄。木质部管胞多数，射线宽2～8列细胞。髓部薄壁细胞较大，有时可见石细胞单个或成群散在。（图1、2）

Transverse section of stem: Epidermal cells subrectangular or oblong, covered with cuticle, the outer edge obtusely dentate. Cortex cells 10 or more layers, the outer part occurring 2～3 layers of collenchymatous cells, parenchymatous cells in the inner part containing brownish-yellow contents, stone cells scattered singly or grouped. Pericyclic fibre bundles crescent, arranged in an interrupted ring, lignified. Phloem narrow. Xylem tracheids numerous, rays 2～8 cells wide. Parenchymatous cells of pith relatively large, sometimes stone cells visible, scattered singly or grouped.（Fig 1,2）

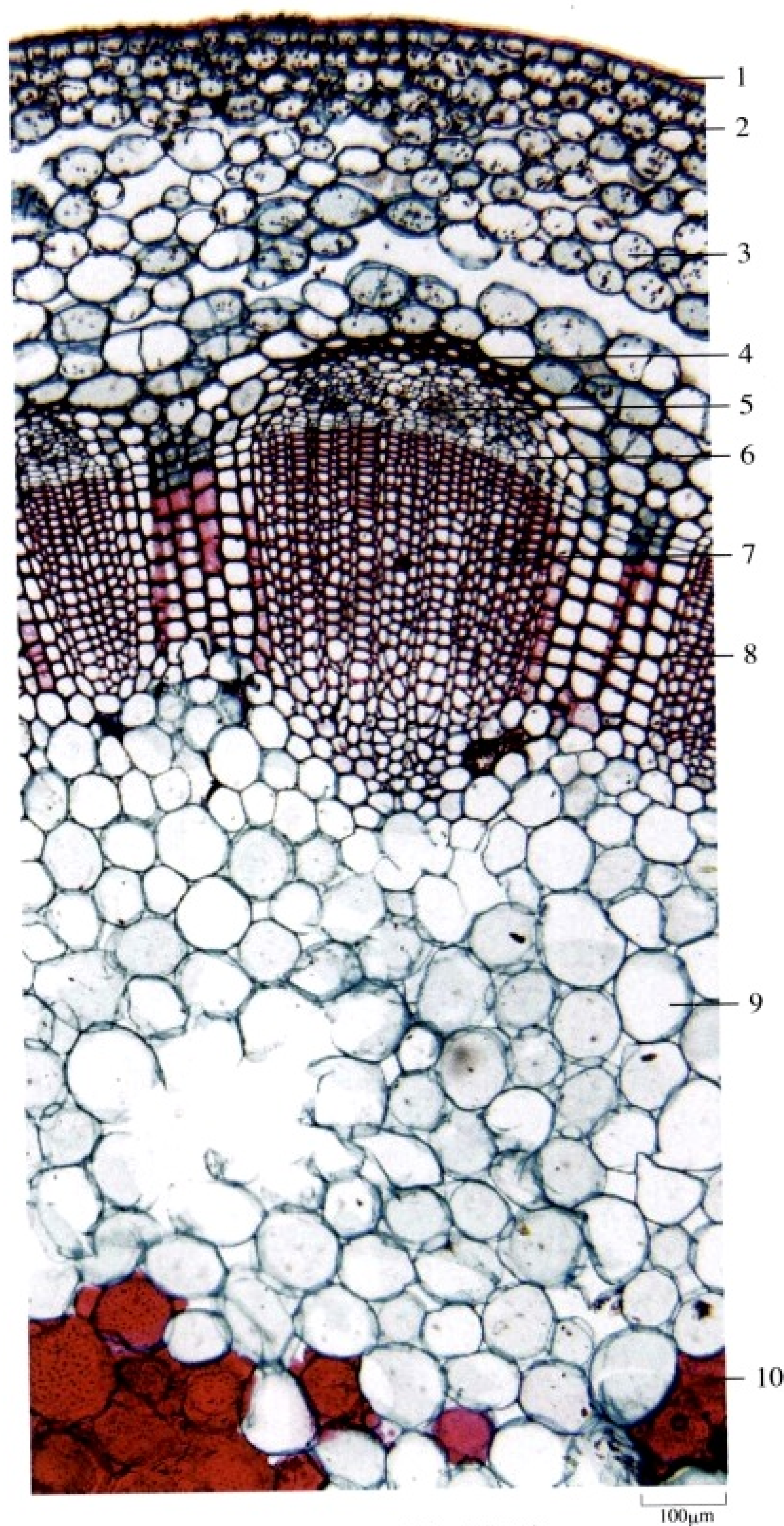


图1　肿节风（*Sarcandra glabra* 茎）横切面

[Fig1　Transverse section of stem from *Sarcandra glabra*]

1. 表皮（Epidermis）　2. 厚角细胞（Collenchymatous cells）　3. 皮层（Cortex）　4.中柱鞘纤维束（Pericyclic fibre bundles）　5. 韧皮部（Phloem）　6. 形成层（Cambium）　7. 木质部（Xylem）　8. 木射线（Xylem rays）　9. 髓（Pith）　10. 石细胞（Stone cells）

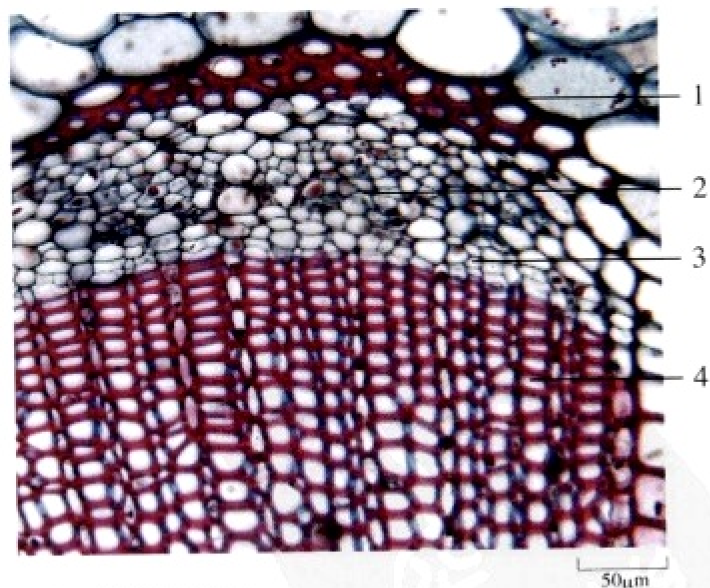


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 中柱鞘纤维束（Pericyclic fibre bundles）　2. 筛管群（Sieve tube groups）　3. 形成层（Cambium）　4. 导管（Vessels）

本品叶的表面观：表皮细胞垂周壁波状弯曲或稍平直，气孔稍下陷，不定式。（图3、4）

Surface view of leaf: Anticlinal walls of epidermal cells sinuous or slightly straight, stomata slightly sunken, anomocytic. (Fig 3,4)

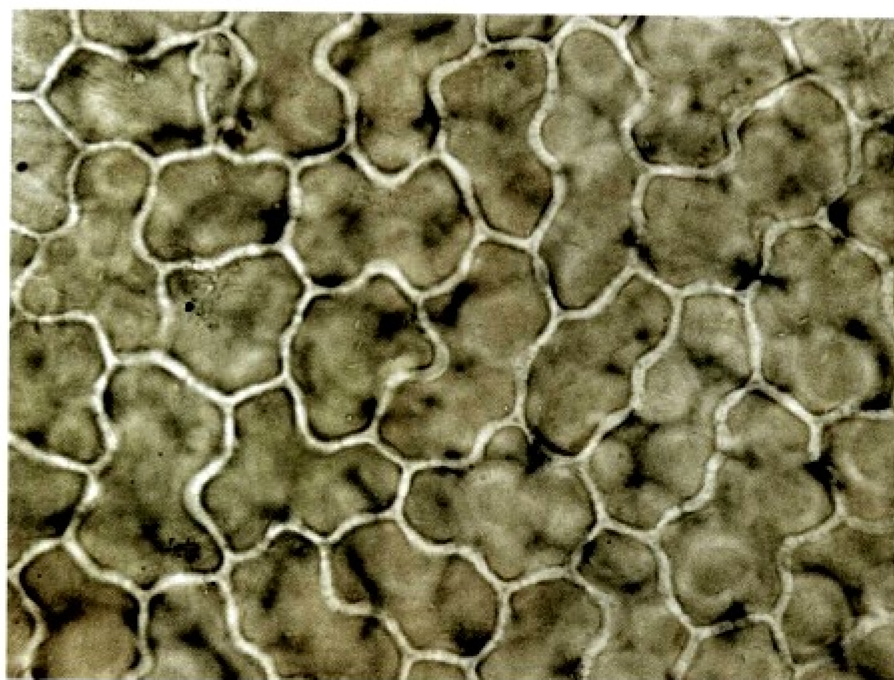


图3　肿节风（*Sarcandra glabra* 叶）上表皮表面观

[Fig3　Surface view of upper epidermis of leaf from *Sarcandra glabra*]



图4　肿节风（*Sarcandra glabra* 叶）下表皮表面观

[Fig4　Surface view of lower epidermis of leaf from *Sarcandra glabra*]

狗　　脊

Gouji

RHIZOMA CIBOTII

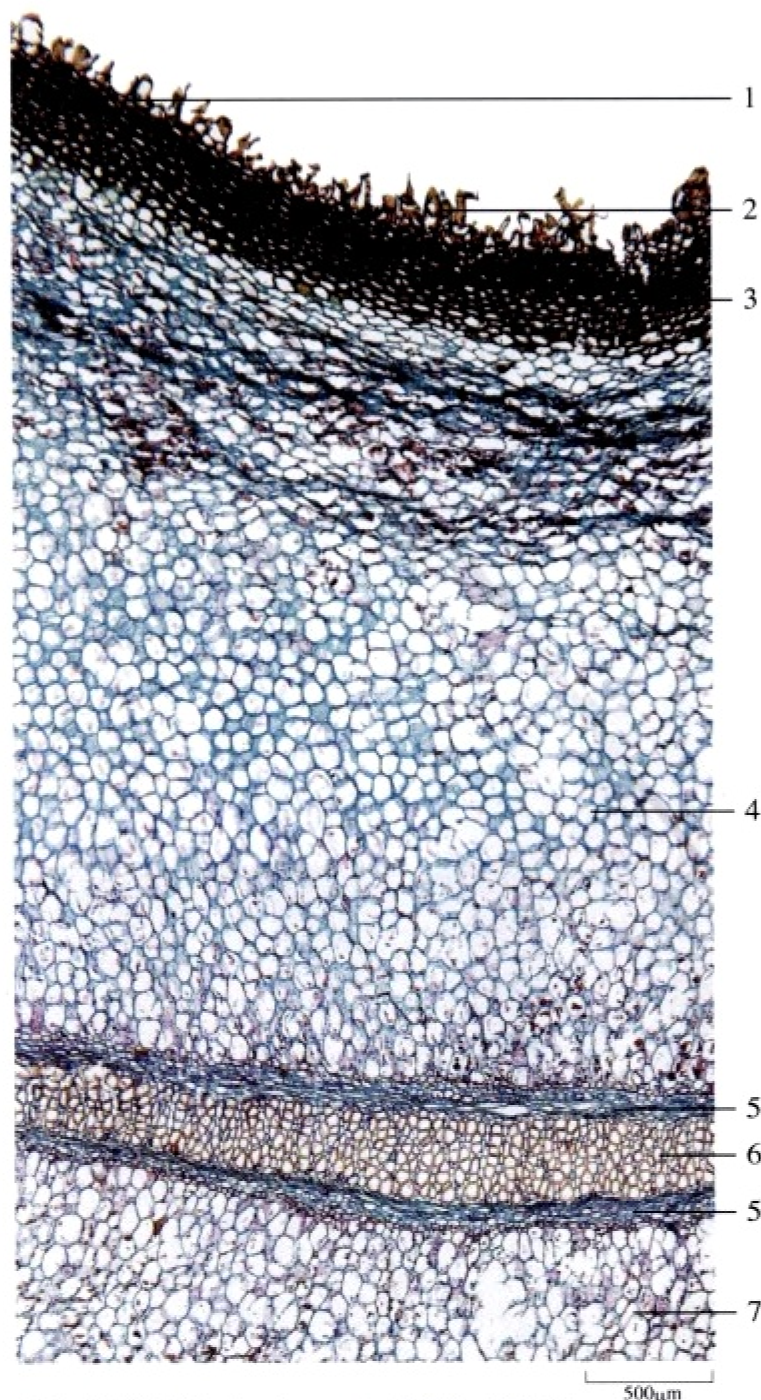


图1　狗脊（*Cibotium barometz* 根茎）横切面

[Fig1　Powder of rhizome from *Cibotium barometz*]

1. 表皮细胞（Epidermal cells）　2. 非腺毛（Non-glandular hairs）　3. 厚壁细胞（Sclerenchymatous cells）　4. 皮层（Cortex）　5. 韧皮部（Phloem）　6. 木质部（Xylem）　7. 髓（Pith）

本品为蚌壳蕨科植物金毛狗脊*Cibotium barometz*（L.）J. Sm. 的干燥根茎。

[显微特征]　**本品横切面**：表皮细胞1列，残存金黄色的非腺毛。其内有10余列棕黄色厚壁细胞，壁孔明显。木质部排列成环，由管胞组成，其内外均有韧皮部及内皮层。皮层及髓，均由薄壁细胞组成，细胞充满淀粉粒，有的含黄棕色物。（图1、2）

Transverse section: Epidermis consisting of 1 layer of cells, with remains of golden non-glandular hairs. The inner of epidermis exhibiting 10 or more layers of brownish yellow sclerenchymatous cells, pits distinct. Xylem arranged in a ring, composed of tracheids, both the inner and outer parts exhibiting phloem and endodermis. Cortex and pith composed of parenchymatous cells filled with starch granules, some with yellowish brown contents.（Fig 1, 2）

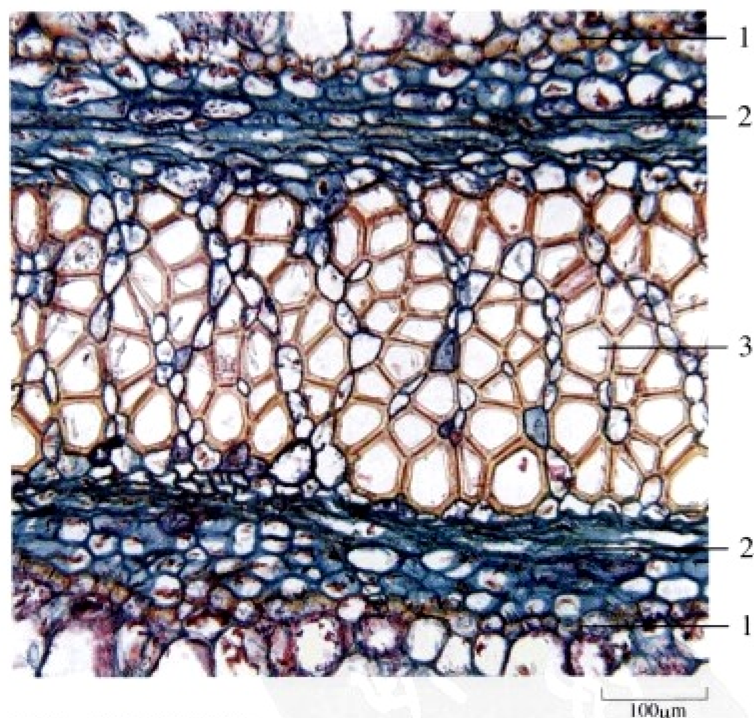


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 内皮层（Endodermis）　2. 韧皮部（Phloem）　3. 管胞（Tracheids）

京 大 戟

Jingdaji

RADIX EUPHORBIAE PEKINENSIS

本品为大戟科植物大戟*Euphorbia pekinensis* Rupr. 的干燥根。

[显微特征]　本品粉末：淡黄色。淀粉粒单粒类圆形或卵圆形，直径3～15μm，脐点点状或裂缝状；复粒由2～3分粒组成。草酸钙簇晶直径19～40μm。具缘纹孔及网纹导管较多见，直径26～50μm。纤维单个或成束，壁较厚，非木化。无节乳管多碎断，内含黄色微细颗粒状乳汁。（图1）

Powder: Pale yellow. Simple starch granules subspheroid or ovoid, 3～15μm in diameter, hilum pointed or slit-shaped; compound granules of 2～3 components. Clusters of calcium oxalate 19～40μm in diameter. Bordered pitted and reticulated vessels more commonly found, 26～50μm in diameter. Fibres individual or in bundles, walls relatively thick and non-lignified. Non-articulate laticiferous tubes mostly broken, containing yellow minute granule-like latex.（Fig 1）

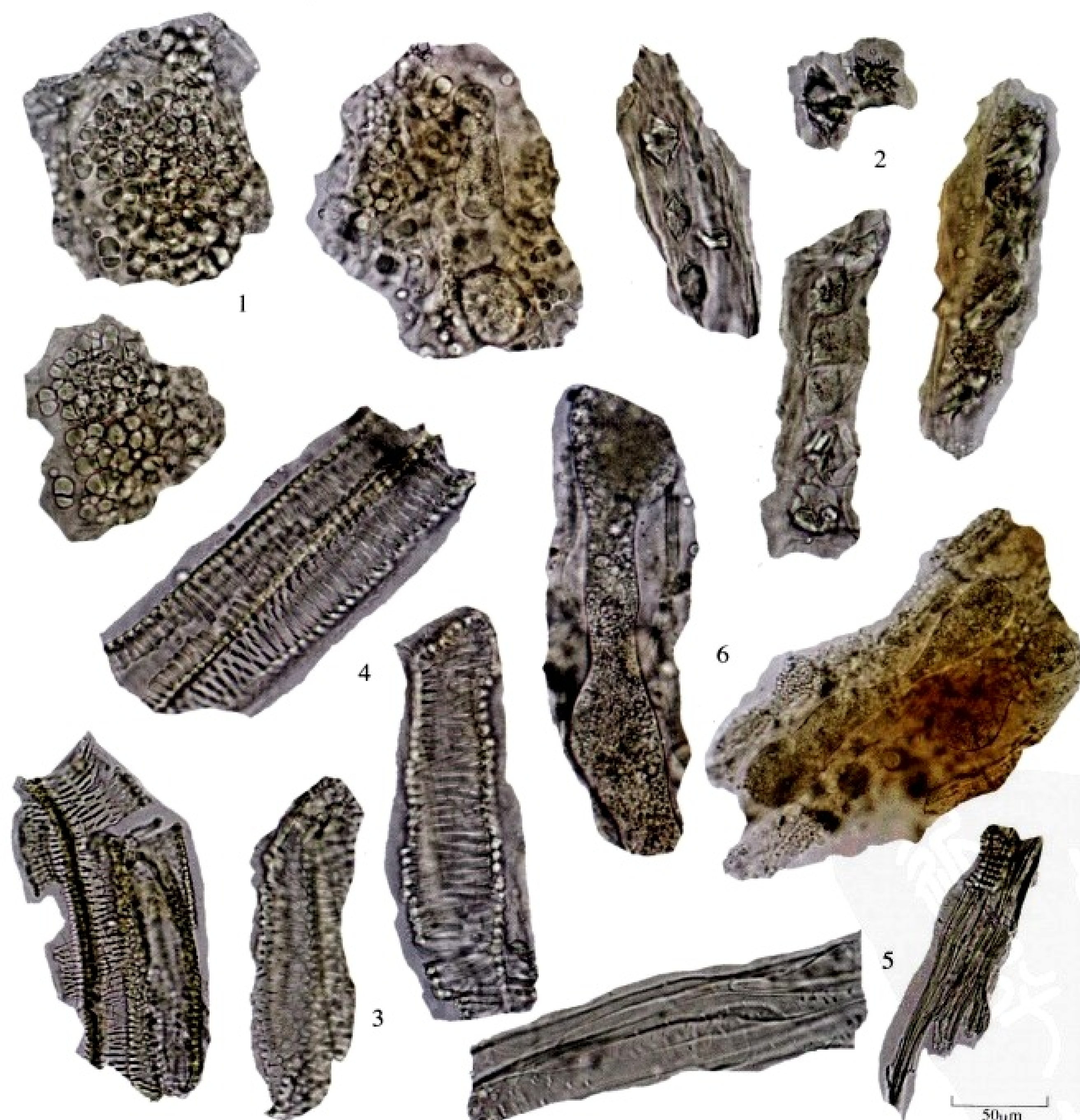


图1　京大戟（*Euphorbia pekinensis* 根）粉末

[Fig1　Powder of root from *Euphorbia pekinensis*]

1. 淀粉粒（Starch granules）　2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 具缘纹孔导管（Bordered pitted vessels）　4. 网纹导管（Reticulated vessels）　5. 纤维（Fibres）　6. 无节乳管（Non-articulate laticiferous tubes）

闹 羊 花

Naoyanghua

FLOS RHODODENDRI MOLLIS

本品为杜鹃花科植物羊踯躅 *Rhododendron molle* G. Don 的干燥花。

[显微特征] **本品粉末**：黄棕色。花粉粒四面体形，直径58～97μm，具3个萌发孔。花萼非腺毛由多细胞组成，交叉排成数列，直径29～68μm。花冠非腺毛单细胞，直径10～20μm，长可达400μm以上，壁薄，有的可见壁疣。花粉囊表皮细胞类多角形或类圆形，直径13～31μm，排列整齐而紧密，壁稍增厚，有的纹孔明显，细胞内含有黄棕色物质。花冠表皮细胞长方形、类方形或不规则形，直径26～78μm，壁薄，呈波状弯曲（图1）。

Powder: Yellowish-brown. Pollen grains tetrahedral, 58～97 μm in diameter, with 3 germinal pores. Non-glandular hairs of calyx multicellular, crossed in several rows, 29～68 μm in diameter. Non-glandular hairs of corolla unicellular, 10～20 μm in diameter, up to 400 μm long, walls thin, sometimes warts visible. Epidermal cells of pollen sac subpolygonal or subrounded, 13～31 μm in diameter, arranged regularly and closely, walls slightly thickened, sometimes with distinct pits, cells containing yellowish-brown contents. Epidermal cells of corolla rectangular, subsquare or irregular, 26～78 μm in diameter, with thin and sinuous walls.(Fig 1)



图1 闹羊花（*Rhododendron molle* 花）粉末

[Fig1 Powder of flower from *Rhododendron molle*]

1.花粉粒（Pollen grains） 2. 花萼非腺毛（Non-glandular hairs of calyx） 3. 花冠非腺毛（Non-glandular hairs of corolla）

泽　　泻

Zexie

RHIZOMA ALISMATIS

本品为泽泻科植物泽泻*Alisma orientalis* （Sam.） Juzep. 的干燥块茎。

[显微特征]　本品粉末：淡黄棕色。淀粉粒甚多，单粒长卵形、类球形或椭圆形，直径3～14μm，脐点人字状、短缝状或三叉状；复粒由2～3分粒组成。薄壁细胞类圆形，具多数椭圆形纹孔，集成纹孔群。内皮层细胞垂周壁波状弯曲，较厚，木化，有稀疏细孔沟。油室大多破碎，完整者类圆形，直径54～110μm，分泌细胞中有时可见油滴。（图1）

Powder: Yellowish-brown. Starch granules numerous, simple granules long ovoid, subspherical or ellipsoid, 3 ~ 14μm in diameter, hilum V-shaped, shortly slit-shaped or Y-shaped; compound granules of 2 ~ 3 components. Parenchymatous cells subrounded, with many elliptical pits aggregated into pit areas. Anticlinal walls of endodermis cells sinuous, relatively thickened, lignified, with sparse and minute pit-canals. Oil cavities mostly broken, whole ones subrounded, 54 ~ 110μm in diameter, sometimes oil drops in secretory cells visible. （Fig 1）



图1　泽泻 （*Alisma orientalis* 块茎） 粉末

[Fig1　Powder of tuber from *Alisma orientalis*]

1. 淀粉粒（Starch granules）　2. 薄壁细胞（Parenchymatous cells）　3. 内皮层细胞（Endodermal cells）　4. 油室碎片（Fragments of oil cavities）

降　香
Jiangxiang
LIGNUM DALBERGIAE ODORIFERAE

本品为豆科植物降香檀*Dalbergia odorifera* T. Chen 树干和根的干燥心材。

[显微特征]　**本品粉末**：棕紫色或黄棕色。具缘纹孔导管巨大，完整者直径约至300μm，多破碎，具缘纹孔大而清晰，管腔内含红棕色或黄棕色物。纤维成束，棕红色，直径8～26μm，壁甚厚，有的纤维束周围细胞含草酸钙方晶，形成晶纤维，含晶细胞的壁不均匀木化增厚。草酸钙方晶直径6～22μm。木射线宽1～2列细胞，高至15细胞，壁稍厚，纹孔较密。色素块红棕色、黄棕色或淡黄色。（图1）

Powder: Brownish-purple or yellowish-brown. Bordered pitted vessels large, up to about 300μm in diameter when intact, mostly broken, with large and distinct bordered pits, containing reddish-brown or yellowish-brown contents. Fibres in bundles, brownish-red, 8 ~ 26μm in diameter, heavily thick walled, some fibre bundles surrounded by cells containing prisms of calcium oxalate, forming crystal fibres, walls of crystal cells unequally thickened and lignified. Prisms of calcium oxalate 6 ~ 22μm in diameter. Xylem rays 1 ~ 2 cells wide, up to 15 cells high, walls slightly thickened, with relatively dense pits. Pigment masses reddish-brown, yellowish-brown or pale yellow.（Fig 1）



图1　降香（*Dalbergia odorifera* 心材）粉末

[Fig1　Powder of heart wood from *Dalbergia odorifera*]

1. 导管（Vessels）　2. 纤维及晶纤维（Fibres and crystal fibres）　3. 草酸钙方晶（Prisms of calcium oxalate）　4. 木射线细胞（Xylem ray cells）　5. 色素块（Pigment masses）

贯叶金丝桃

Guanyejinsitao

HERBA HYPERICI PERFORATI

本品为藤黄科植物贯叶金丝桃*Hypericum perforatum* L. 的干燥地上部分。

[显微特征] **本品叶表面观**：叶上表皮细胞多角形，细胞壁连珠状增厚；叶下表皮细胞多角形，垂周壁波状弯曲，略呈连珠状增厚，气孔平轴式或不定式。黑色腺点由一团分泌细胞组成，细胞内容物红色；半透明腺点为分泌囊结构，由1层上皮细胞包围圆形腔隙构成，内含油状物。（图1）

Surface view of leaf: Cells of upper epidermis polygonal, with beaded walls, the cells of lower epidermis polygonal, anticlinal walls sinuous, somewhat beaded, stomata paracytic or anomocytic. Black glandular spots consisting of secretory cells with red contents in lumina; translucent glandular spots with structure of secretory sacs, consisting of 1 layer of epithelium cells surrounding the rounded lacuna which containing oily contents. （Fig 1）

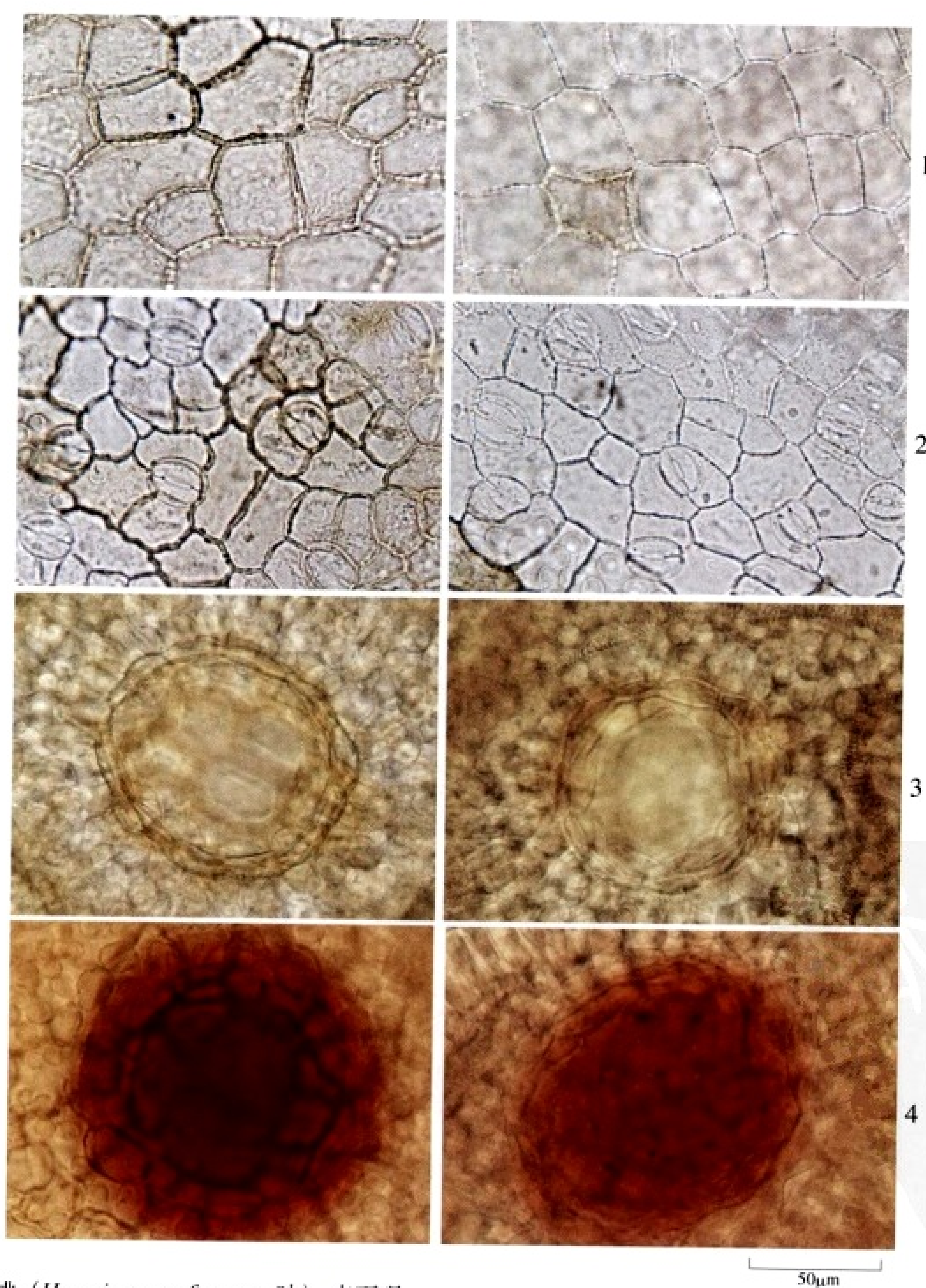


图1 贯叶金丝桃（*Hypericum perforatum* 叶）表面观

[Fig1 Surface view of leaf from *Hypericum perforatum*]

1. 上表皮细胞（Upper epidermal cells） 2. 下表皮细胞（Lower epidermal cells） 3. 分泌囊（Secretory sacs） 4. 分泌细胞（Secretory cells）

荆 芥 炭

Jingjietan

HERBA SCHIZONEPETAE CARBONISATUM

本品为荆芥*Schizonepeta tenuifolia* Briq. 干燥地上部分的炮制加工品。

[显微特征] **本品粉末**：黑色。外果皮细胞表面观多角形，壁黏液化多不明显，胞腔含棕色物。内果皮石细胞淡棕色，表面垂周壁深波状弯曲，密具纹孔。纤维成束，壁平直或微波状。宿萼表皮细胞垂周壁深波状弯曲。腺鳞头部8细胞，直径95～110μm，柄单细胞。非腺毛1～6细胞，大多具壁疣。（图1）

Powder: Black. Cells of exocarp polygonal in surface view, with mucilaginous walls, lumina containing brown contents. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls, and densely pitted. Fibre bundles with straight or slight sinuous walls. Glandular scales each with an 8-celled head, 95～110μm in diameter, and an unicellular stalk. Non-glandular hairs 1～6 celled, mostly with warty walls.（Fig 1）



图1 荆芥炭（*Schizonepeta tenuifolia* 地上部分的炮制加工品）粉末

[Fig1 Powder of the processed aerial part from *Schizonepeta tenuifolia*]

1. 外果皮细胞（Cells of exocarp） 2. 内果皮石细胞（Stone cells of endocarp） 3. 纤维（Fibres） 4. 非腺毛（Non-glandular hairs） 5. 腺鳞（Glandular scales） 6. 宿萼表皮细胞（Epidermal cells of persistent calyx）

荆　　芥

Jingjie

HERBA SCHIZONEPETAE

本品为唇形科植物荆芥*Schizonepeta tenuifolia* Briq. 的干燥地上部分。

[显微特征]　本品粉末：黄棕色。宿萼表皮细胞垂周壁深波状弯曲。腺鳞头部8细胞，直径96～112μm，柄单细胞，棕黄色。小腺毛头部1～2细胞，柄单细胞。非腺毛1～6细胞，大多具壁疣。外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物；断面观细胞类方形或长方形，胞腔小。内果皮石细胞淡棕色，表面观垂周壁深波状弯曲，密具纹孔。纤维直径14～43μm，壁平直或微波状。(图1)

Powder: Yellowish-brown. Epidermal cells of persistent calyx with deeply sinuous anticlinal walls. Glandular scales each with a 8-celled head, 96～112μm in diameter, and an brownish-yellow unicellular stalk. Small glandular hairs each with a 1～2 celled head and an unicellular stalk. Non-glandular hairs 1～6 celled, mostly with warty walls. Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown contents; cells subsquare or rectangular in sectional view and with small lumina. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls in surface view and densely pitted. Fibres 14～43μm in diameter, with straight or slightly sinuous walls. (Fig 1)

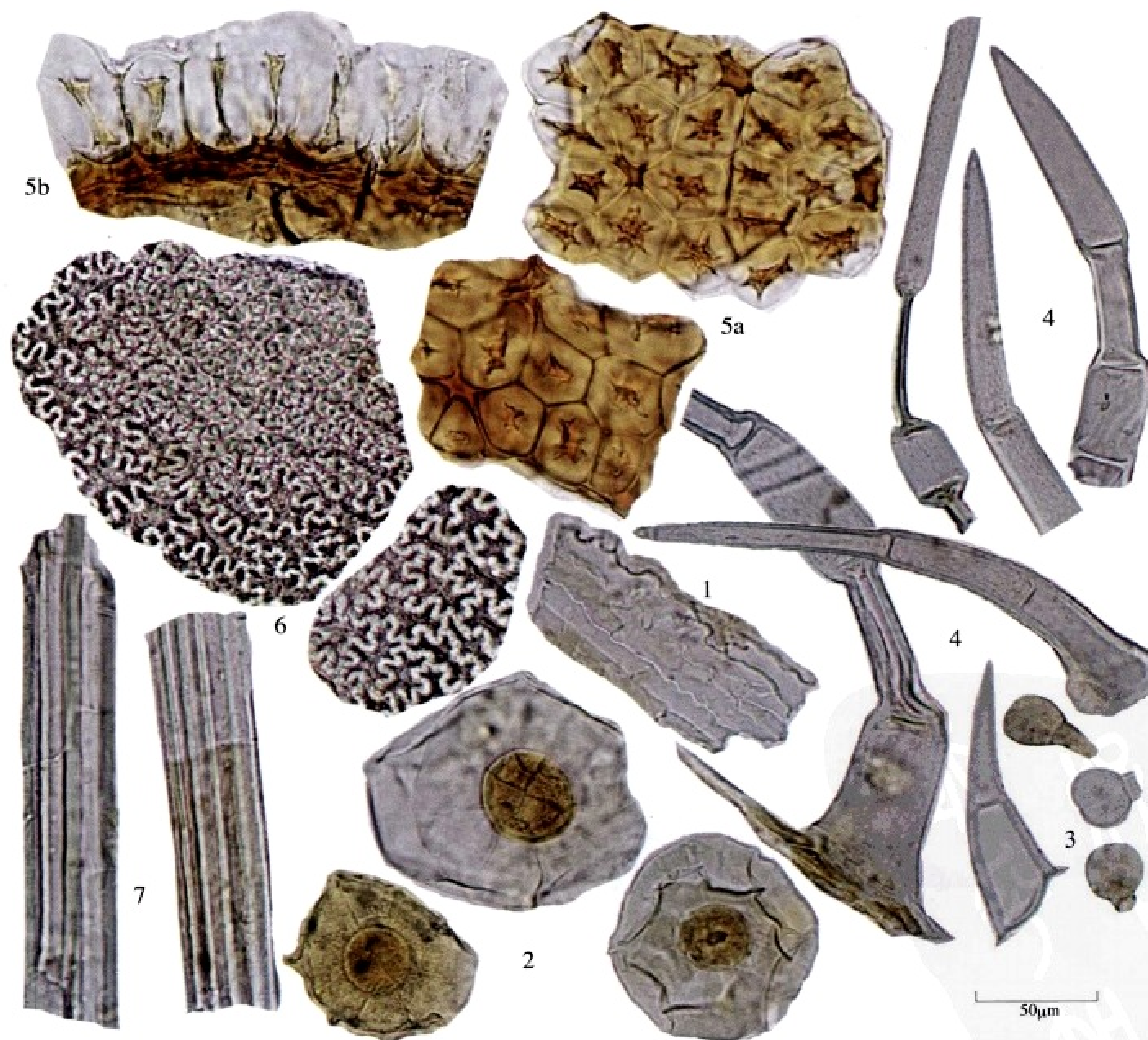


图1　荆芥（*Schizonepeta tenuifolia* 地上部分）粉末

[Fig1　Powder of aerial part of *Schizonepeta tenuifolia*]

1. 宿萼表皮细胞（Epidermal cells of persistent calyx）　2. 腺鳞（Glandular scales）　3. 小腺毛（Small glandular hairs）　4. 非腺毛（Non-glandular hairs）　5.外果皮细胞[Cells of exocarp（a. 表面观Surface view　b. 断面观Sectional view）]　6. 内果皮石细胞（Stone cells of endocarp）　7. 纤维（Fibres）

珍 珠 母

Zhenzhumu

CONCHA MARGARITIFERA

本品为蚌科动物三角帆蚌*Hyriopsis cumingii*（Lea）、褶纹冠蚌*Cristaria plicata*（Leach）或珍珠贝科动物马氏珍珠贝*Pteria martensii*（Dunker）的贝壳。

[显微特征] **本品粉末**：类白色。不规则碎块，表面多不平整，呈明显的颗粒性，有的呈层状结构，边缘多数为不规则锯齿状。棱柱形碎块少见，断面观呈棱柱状，断面大多平截，有明显的横向条纹，少数条纹不明显。（图1）

Powder: Whitish. Irregular broken pieces, surface mostly uneven, with distinct granular nature, some in laminated structure, margin mostly irregular serrated. Prism-shaped pieces occasionally, truncate in fracture view, mostly bearing distinct transverse stripes, and a few no obvious stripes. （Fig 1）



图1 珍珠母粉末

[Fig1 Powder of shell]

1. 不规则碎块（Irregular pieces） 2. 棱柱形碎块（Prism pieces） 3. 偏光镜下不规则碎块呈多彩色（Irregular polychromatic pieces under polarizing microscope）

珍　　珠

Zhenzhu

MARGARITA

本品为珍珠贝科动物马氏珍珠贝*Pteria martensii*（Dunker）、蚌科动物三角帆蚌*Hyriopsis cumingii*（Lea）或褶纹冠蚌*Cristaria plicata*（Leach）等双壳类动物受刺激形成的珍珠。

[显微特征]　本品粉末：类白色。不规则碎块，半透明，具彩虹样光泽。表面显颗粒性，由数至十数薄层重叠，片层结构排列紧密，可见致密的成层线条或极细密的微波状纹理。（图1）

本品磨片具同心层纹。

Powder: Whitish. Irregular pieces, translucent, with rainbow-like lustre. Surface granular, piled up by several to ten thin layers, laminae densely arranged, dense laminated lines or finely undulated striations visible. （Fig 1）

Ground slices marked with concentric striations.



图1　珍珠粉末

[Fig1　Powder of pearl]

1. 不规则碎块（Irregular pieces）　2. 偏光镜下不规则碎块呈多彩色（Irregular polychromatic pieces under polarizing microscope）

荆 芥 穗

Jingjiesui

SPICA SCHIZONEPETAE

本品为唇形科植物荆芥*Schizonepeta tenuifolia* Briq. 的干燥花穗。

[显微特征] **本品粉末**：黄棕色。宿萼表皮细胞垂周壁深波状弯曲。腺鳞头部8细胞，直径95～110μm，柄单细胞，棕黄色。小腺毛头部1～2个细胞，柄单细胞。非腺毛1～6细胞，大多具壁疣。外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物；断面观细胞类方形或长方形，胞腔小。内果皮石细胞淡棕色，表面观垂周壁深波状弯曲，密具纹孔。纤维成束，壁平直或微波状。（图1）

Powder: Yellowish-brown. Epidermal cells of persistent calyx with deeply sinuous anticlinal walls. Glandular scales with a 8-celled head, 95～110μm in diameter, and an unicellular stalk, brownish-yellow. Small glandular hairs each with a 1～2 celled head and an unicellular stalk. Non-glandular hairs 1～6 celled, mostly with warty walls. Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown contents; cells subsquare or rectangular in sectional view and with small lumina. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls in surface view and densely pitted. Fibres in bundles with straight or slight sinuous walls. （Fig 1）



图1 荆芥穗（*Schizonepeta tenuifolia* 花穗）粉末

[Fig1 Powder of flowering spike from *Schizonepeta tenuifolia*]

1. 宿萼表皮细胞（Epidermal cells of persistent calyx） 2. 腺鳞（Glandular scales） 3.小腺毛（Small glandular hairs） 4. 非腺毛（Non-glandular hairs） 5. 外果皮细胞[Cells of exocarp （a. 表面观Surface view b. 断面观Sectional view）] 6. 内果皮石细胞（Stone cells of endocarp） 7. 纤维（Fibres）

荆芥穗炭

Jingjiesuitan

SPICA SCHIZONEPETAE CARBONISATA

本品为荆芥*Schizonepeta tenuifolia* Briq. 干燥花穗的炮制加工品。

[显微特征]　**本品粉末**：黑色。外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物。内果皮石细胞淡棕色，垂周壁深波状弯曲，密具纹孔。纤维成束。腺鳞头部8细胞，直径95～110μm，柄单细胞。非腺毛1～6细胞，大多具壁疣。（图1）

Powder: Black. Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown contents. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls, and densely pitted. Fibres in bundles. Glandular scales each with a 8-celled head and an unicellular stalk, 95～110μm in diameter. Non-glandular hairs 1～6 celled, mostly with warty walls. (Fig 1)



图1　荆芥穗炭（*Schizonepeta tenuifolia* 花穗的炮制加工品）粉末

[Fig1　Powder of prepared flowering spike from *Schizonepeta tenuifolia*]

1. 外果皮细胞（Cells of exocarp）　2. 内果皮石细胞（Stone cells of endocarp）　3. 纤维（Fibres）　4. 非腺毛（Non-glandular hairs）　5. 腺鳞（Glandular scales）

茜　　草

Qiancao

RADIX ET RHIZOMA RUBIAE

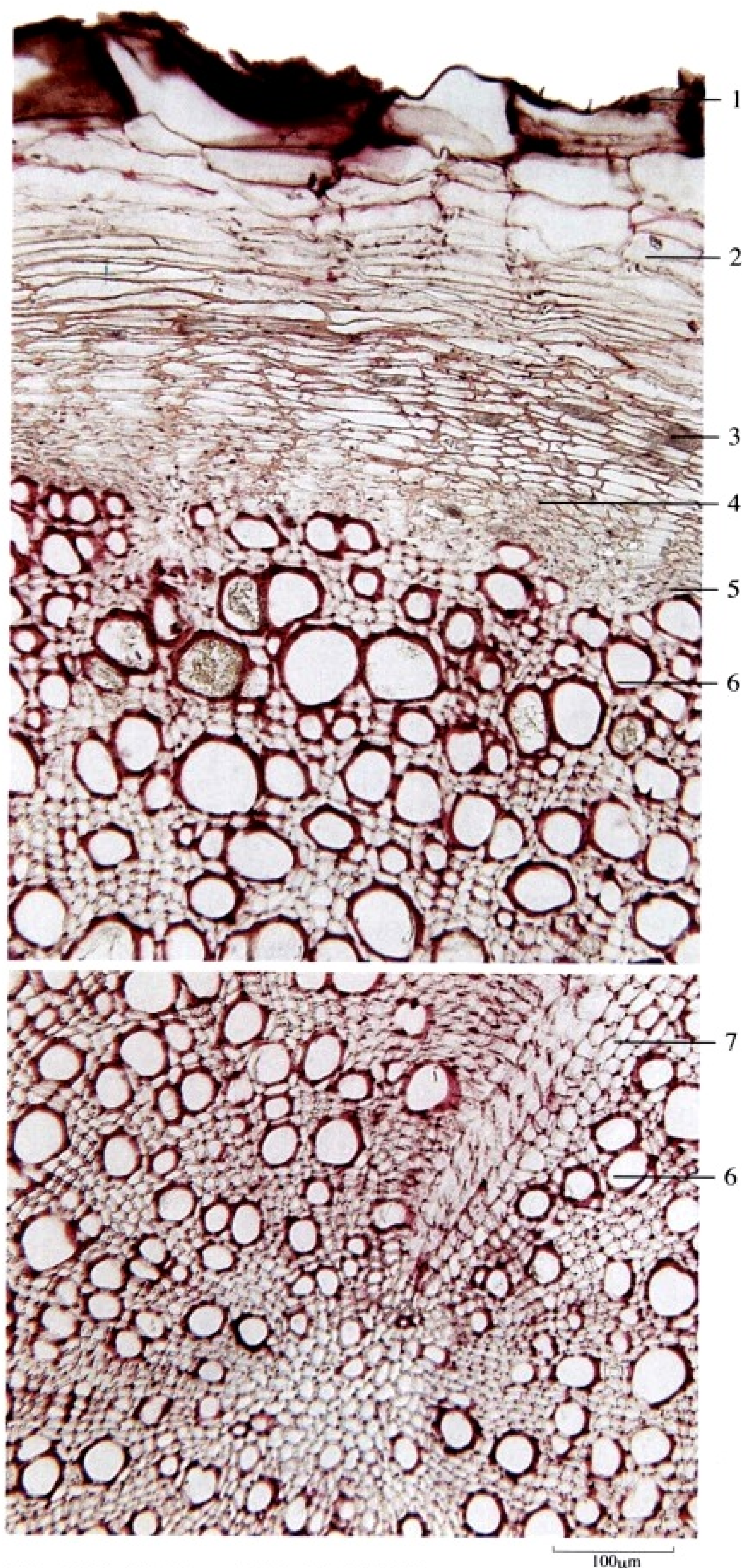


图1　茜草（*Rubia cordifolia* 根）横切面

[Fig1　Transverse section of root from *Rubia cordifolia*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 草酸钙针晶束（Raphides of calcium oxalate）　4. 韧皮部（Phloem）　5. 形成层（Cambium）　6. 木质部（Xylem）7. 木射线（Xylem rays）

本品为茜草科植物茜草*Rubia cordifolia* L. 的干燥根及根茎。

[显微特征]　**本品根横切面：**木栓细胞6～12列，含棕色物。栓内层薄壁细胞有的含红棕色颗粒。韧皮部细胞较小。形成层不甚明显。木质部占根的主要部分，全部木化，射线不明显。薄壁细胞含草酸钙针晶束。（图1、2）

Transverse section of root: Cork cells 6～12 layered, containing brown contents. Parenchymatous cells in phelloderm sometimes containing reddish-brown granules. Cells in phloem relatively small. Cambium ring less distinct. Majority of root occupied by wood, completely lignified, xylem rays indistinct. Parenchymatous cells containing raphides of calcium oxalate.（Fig 1, 2）

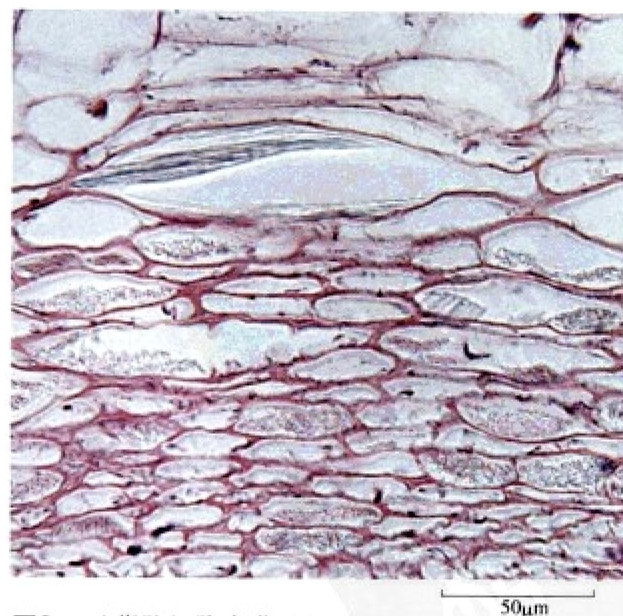


图2　示薄壁细胞含草酸钙针晶

[Fig2　Showing parenchymatous cells containing raphides of calcium oxalate]

荜　茇

Biba

FRUCTUS PIPERIS LONGI

本品为胡椒科植物荜茇*Piper longum* L. 的干燥近成熟或成熟果穗。

[显微特征]　本品粉末：灰褐色。石细胞类圆形、长卵形或多角形，直径25～61μm，长至170μm，壁较厚，有的层纹明显。油细胞类圆形，直径25～66μm。内果皮细胞表面观呈长多角形，垂周壁不规则连珠状增厚，常与棕色种皮细胞连结。种皮细胞红棕色，表面观呈长多角形。淀粉粒细小，常聚集成团块。(图1)

Powder: Greyish-brown. Stone cells subrounded, long ovoid or polygonal, 25 ~ 61μm in diameter, up to 170μm long, walls relatively thickened, some distinctly striated. Oil cells subrounded, 25 ~ 66μm in diameter. Endocarp cells long-polygonal in surface view, anticlinal walls irregularly beaded thickened, often linked to brown cells of testa. Cells of testa reddish-brown, long polygonal. Starch granules small, usually aggregated to masses. (Fig 1)



图1　荜茇（*Piper longum* 果穗）粉末

[Fig1　Powder of fruit spike from *Piper longum*]

1. 石细胞（Stone cells）　2. 油细胞（Oil cells）　3. 内果皮细胞（Endocarp cells）　4. 种皮细胞（Cells of testa）　5. 淀粉粒（Starch granules）

草　乌

Caowu

RADIX ACONITI KUSNEZOFFII

本品为毛茛科植物北乌头*Aconitum kusnezoffii* Reichb. 的干燥块根。

[显微特征]　本品横切面： 后生皮层为7～8列棕黄色栓化细胞；皮层有石细胞，单个散在或2～5个成群，类长方形、方形或长圆形，胞腔大；内皮层明显。韧皮部宽广，常有不规则裂隙，筛管群随处可见。形成层环呈不规则多角形或类圆形。木质部导管1～4列或数个相聚，位于形成层角隅的内侧，有的内含棕黄色物。髓部较大。薄壁细胞充满淀粉粒。(图1、2)

Transverse section: Metaderm consisting of 7～8 layers of brownish-yellow suberized cells; cortex with stone cells, single or 2～5 grouped, subrectangular, square or oblong, lumina large, endodermis distinct. Phloem broad, usually with irregular clefts, groups of sieve-tubes abundant. Cambium ring irregularly polygonal or subrounded. Vessels in xylem in 1～4 rows or several in groups, located inside each angle of the cambium, some containing brownish-yellow contents. Pith relatively large. Parenchymatous cells filled with starch granules. (Fig 1, 2)

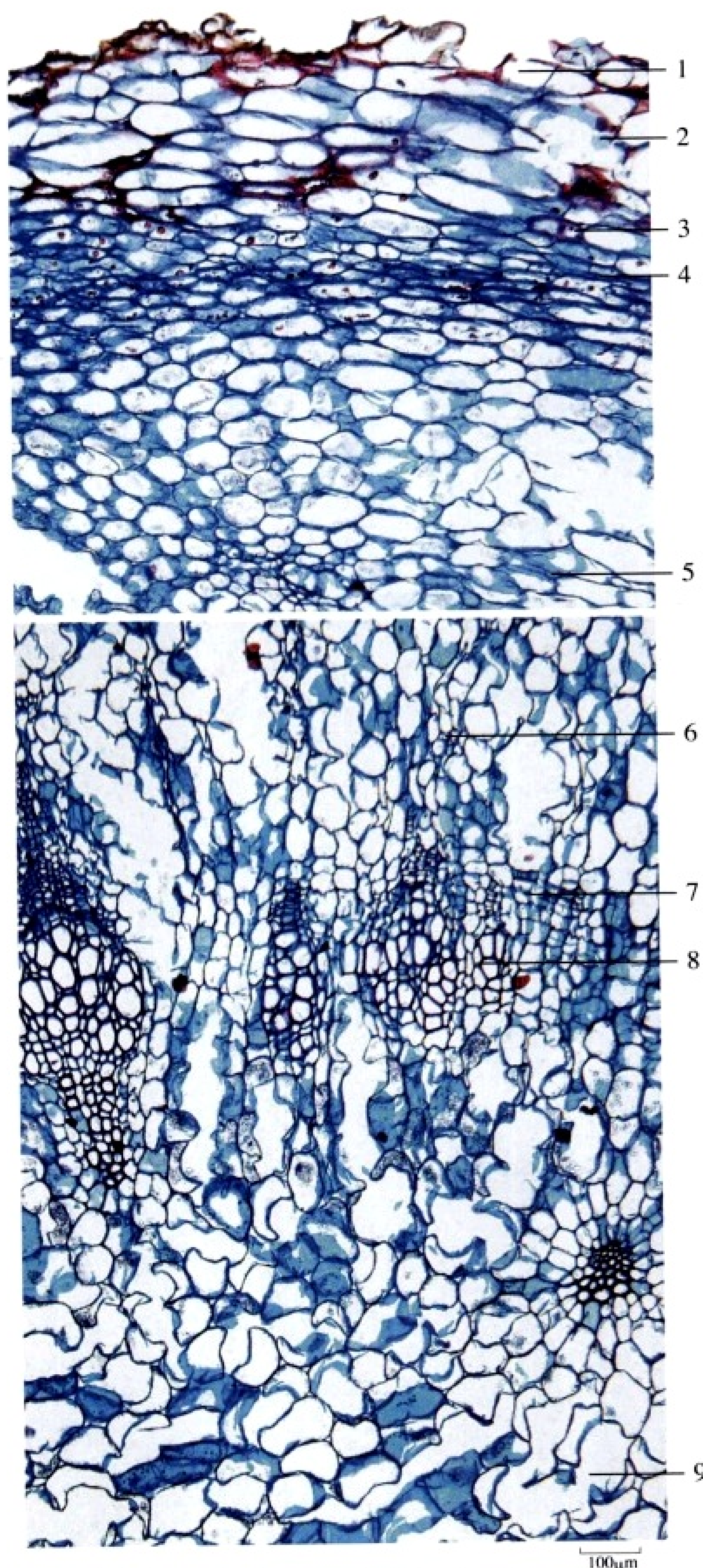


图1　草乌（*Aconitum kusnezoffii* 块根）横切面

[Fig1　Transverse section of root tuber from *Aconitum kusnezoffii*]

1. 后生皮层（Metaderm）　2. 皮层（Cortex）　3. 石细胞（Stone cells）　4. 内皮层（Endodermis）　5. 韧皮部（Phloem）　6. 筛管群（Sieve tube groups）　7. 形成层（Cambium）　8. 木质部（Xylem）　9. 髓（Pith）

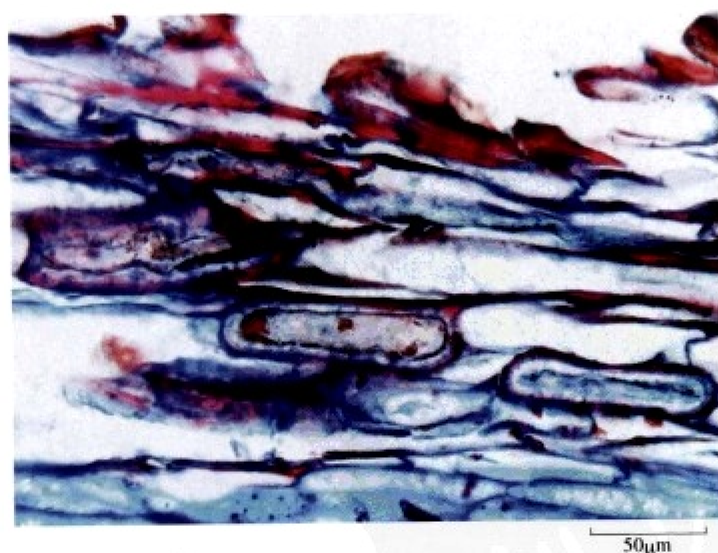


图2　示石细胞

[Fig2　Showing stone cells]

本品粉末：灰棕色。淀粉粒单粒类圆形，直径2～23μm；复粒由2～16分粒组成。石细胞无色，与后生皮层细胞连结的显棕色，呈类方形、类长方形、类圆形、梭形或长条形，直径20～133（～234）μm，长至465μm，壁厚薄不一，壁厚者层纹明显，纹孔细，有的含棕色物。后生皮层细胞棕色，表面观呈类方形或长多角形，壁不均匀增厚，有的呈瘤状突入细胞腔。（图3）

Powder: Greyish-brown. Simple starch granules subrounded, 2 ~ 23 μm in diameter; compound granules consisting of 2 ~ 16 components. Stone cells colourless but brown when adhering to the fragments of metaderm, subsquare, subrectangular, subrounded, fusiform or elongated rectangular, 20 ~ 133 (~234) μm in diameter, up to 465 μm long, walls varying in thickness, the thick-walled cells distinctly striated and finely pitted, some containing brown contents. Cells of metaderm brown, subsquare or long-polygonal in surface view, walls unevenly thickened, some appearing tubercular and projecting into lumina. (Fig 3)

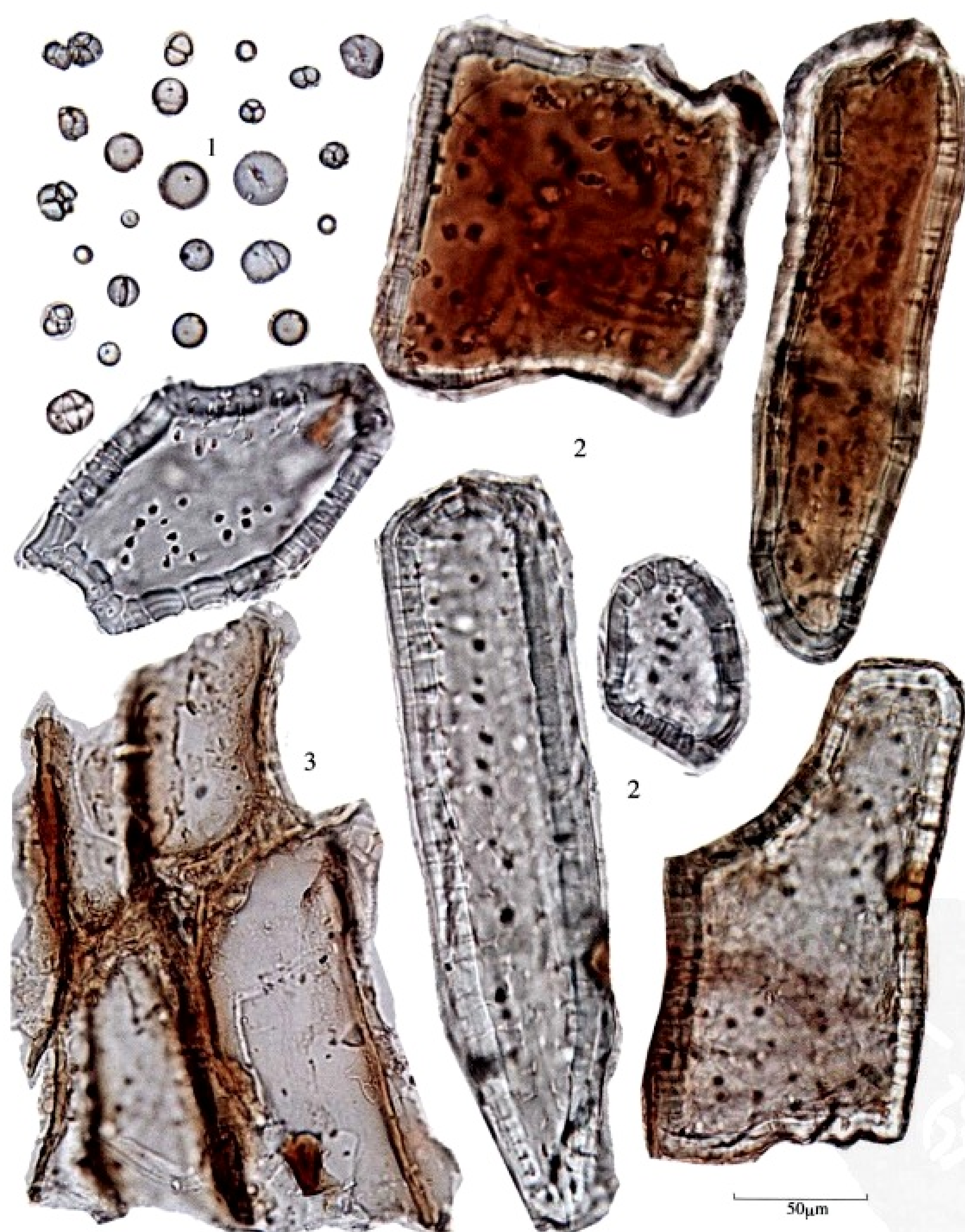


图3 草乌（*Aconitum kusnezoffii* 块根）粉末

[Fig3 Powder of root tuber from *Aconitum kusnezoffii*]

1. 淀粉粒（Starch granules） 2. 石细胞（Stone cells） 3. 后生皮层细胞（Cells of metaderm）

草 乌 叶

Caowuye

FOLIUM ACONITI KUSNEZOFFII

本品为毛茛科植物北乌头*Aconitum kusnezoffii* Reichb. 的干燥叶。

【显微特征】 本品表面观：上表皮细胞垂周壁微波状弯曲，外平周壁有的可见稀疏角质纹理；非腺毛单细胞，多呈镰刀状弯曲，长约至468μm，直径44μm，壁具疣状突起。下表皮细胞垂周壁深波状弯曲；气孔较多，不定式，副卫细胞3～5个。(图1)

Surface view of leaf: Anticlinal walls of upper epidermal cells slightly sinuous, the outer periclinal walls sometimes with sparsely striated cuticle. Non-glandular hairs unicellular, mostly sickle-shaped curved, up to 468 μm long, 44 μm in diameter, with warty walls. Anticlinal walls of lower epidermal cells strongly sinuous; stomata numerous, anomocytic, with 3～5 subsidiary cells. (Fig 1)



图1 草乌叶（*Aconitum kusnezoffii* 叶）表面观

[Fig1 Surface view of leaf from *Aconitum kusnezoffii*]

1. 上表皮细胞（Upper epidermal cells） 2. 非腺毛（Non-glandular hairs） 3. 下表皮细胞及气孔（Lower epidermal cells and stomata）

草　豆　蔻

Caodoukou

SEMEN ALPINIAE KATSUMADAI

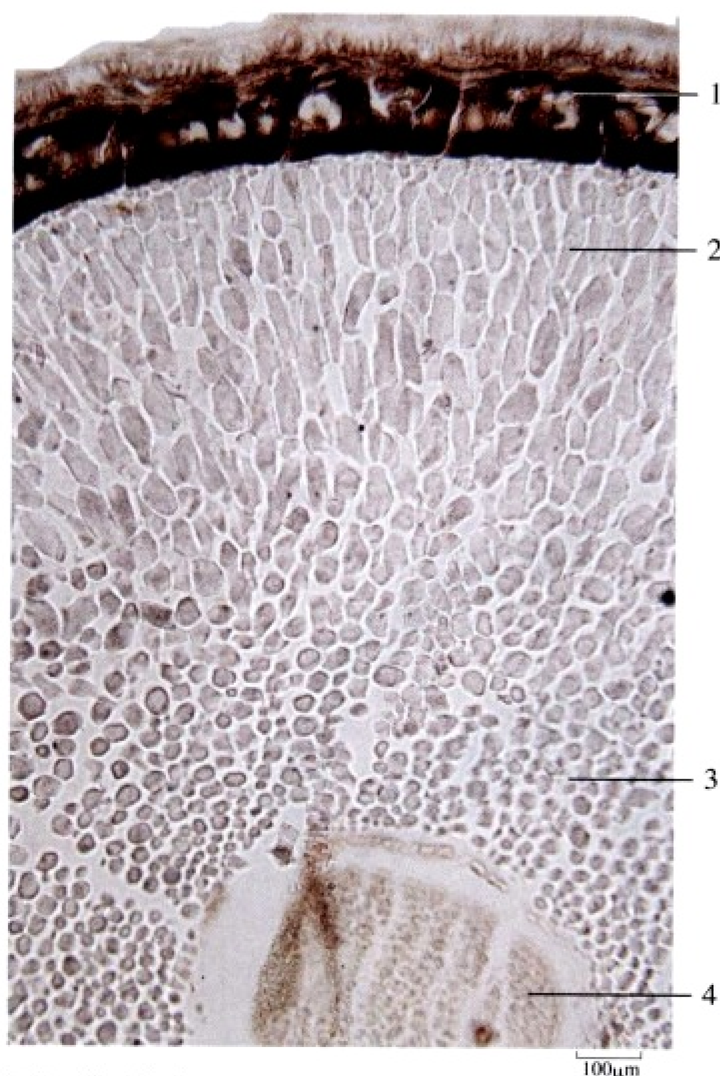


图1　草豆蔻（*Alpinia katsumadai* 种子）横切面

[Fig1　Transverse section of seed from *Alpinia katsumadai*]

1. 种皮（Testa）　2. 外胚乳（Perisperm）　3. 内胚乳（Endosperm）　4. 种皮（Testa）

本品为姜科植物草豆蔻*Alpinia katsumadai* Hayata的干燥近成熟种子。

[显微特征]　本品横切面：假种皮有时残存，为多角形薄壁细胞。种皮表皮细胞类圆形，壁较厚；下皮细胞1～3列，略切向延长；色素层为数列棕色细胞，其间散有类圆形油细胞1～2列，油细胞直径约50μm；内种皮为1列栅状厚壁细胞，棕红色，内壁与侧壁极厚，胞腔小，内含硅质块。外胚乳细胞含淀粉粒及草酸钙方晶和少数细小簇晶。内胚乳细胞含糊粉粒。(图1、2)

Transverse section: Aril remains sometimes present, consisting of polygonal thin-walled cells. Epidermal cells of testa subrounded, walls relatively thickened; hypodermis consisting of 1～3 layers of cells, slightly elongated tangentially; pigment layer consisting of several layers of brown cells, scattered with 1～2 layers of subrounded oil cells about 50 μm in diameter; endotesta consisting of 1 layer of palisade sclerenchymatous cells, brownish-red, with heavily thickened inner and lateral walls and small lumina containing sillica bodies. Cells of perisperm containing starch granules, prisms and a few small clusters of calcium oxalate. Cells of endosperm containing aleurone grains. (Fig 1, 2)

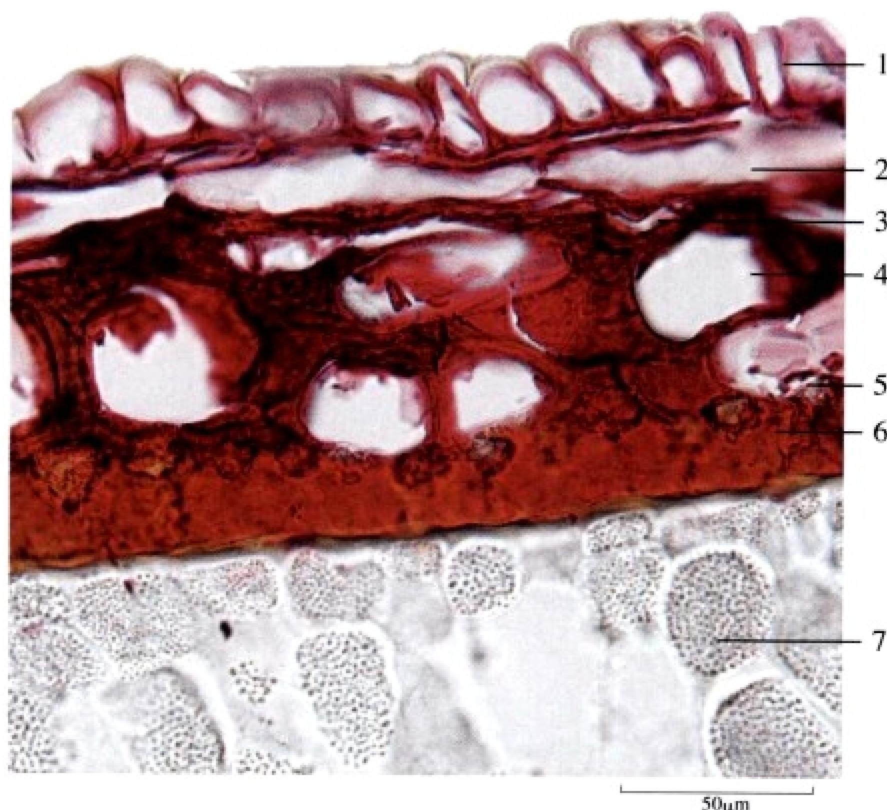


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 种皮表皮细胞（Epidermal cells of testa）　2. 下皮细胞（Hypodermal cells）　3. 色素层（Pigment layer）　4. 油细胞（Oil cells）　5. 硅质块（Sillica bodies）　6. 内种皮栅状厚壁细胞（Palisade sclerenchymatous cells of endotesta）　7. 外胚乳细胞（Perisperm cells）

本品粉末：黄棕色。种皮表皮细胞表面观呈长条形，直径约至30μm，壁稍厚，常与下皮细胞上下层垂直排列；下皮细胞表面观长多角形或类长方形。色素层细胞皱缩，界限不清楚，含红棕色物，易碎裂成不规则色素块。油细胞散生于色素层细胞间，呈类圆形或长圆形，含黄绿色油状物。内种皮厚壁细胞黄棕色或红棕色，表面观多角形，壁厚，非木化，胞腔内含硅质块；断面观细胞1列，栅状，内壁及侧壁极厚，胞腔偏外侧，内含硅质块。外胚乳细胞充满淀粉粒集结成的淀粉团，有的包埋有细小草酸钙方晶。内胚乳细胞含糊粉粒及脂肪油滴。（图3）

Powder: Yellowish-brown. Epidermal cells of testa stripe-shaped in surface view, up to 30 μm in diameter, slightly thick-walled, usually vertically alternating to hypodermal cells; hypodermal cells prolate polygonal or subrectangular in surface view. Pigment cells shrivelled with indistinct borders, containing reddish-brown contents, and mostly broken into irregular masses of pigment. Oil cells scattered among the pigment layer, subrounded or oblong and containing yellowish-green oily contents. Sclerenchymatous cells of endotesta yellowish-brown or reddish-brown, polygonal in surface view, with thickened and unlignified walls, and lumina containing silica bodies; 1 layer and palisade-like in section view, with heavily thickened inner and lateral walls, and lumina outward eccentric, containing silica bodies. Cells of perisperm filled with masses of starch granules, some containing fine prisms of calcium oxalate. Cells of endosperm containing aleurone grains and fixed oil droplets. (Fig 3)



图3 草豆蔻 （*Alpinia katsumadai* 种子） 粉末

[Fig3 Powder of seed from *Alpinia katsumadai*]

1. 种皮表皮细胞（Epidermal cells of testa） 2. 下皮细胞（Hypodermal cells） 3. 内种皮厚壁细胞及硅质块 [Sclerenchymatous cells of endotesta and silica bodies （a. 表面观Surface view b. 断面观Sectional view）] 4. 油细胞 （Oil cells） 5. 外胚乳细胞 （Cells of perisperm） 6. 内胚乳细胞 （Cells of endosperm）

草　果

Caoguo

FRUCTUS TSAOKO

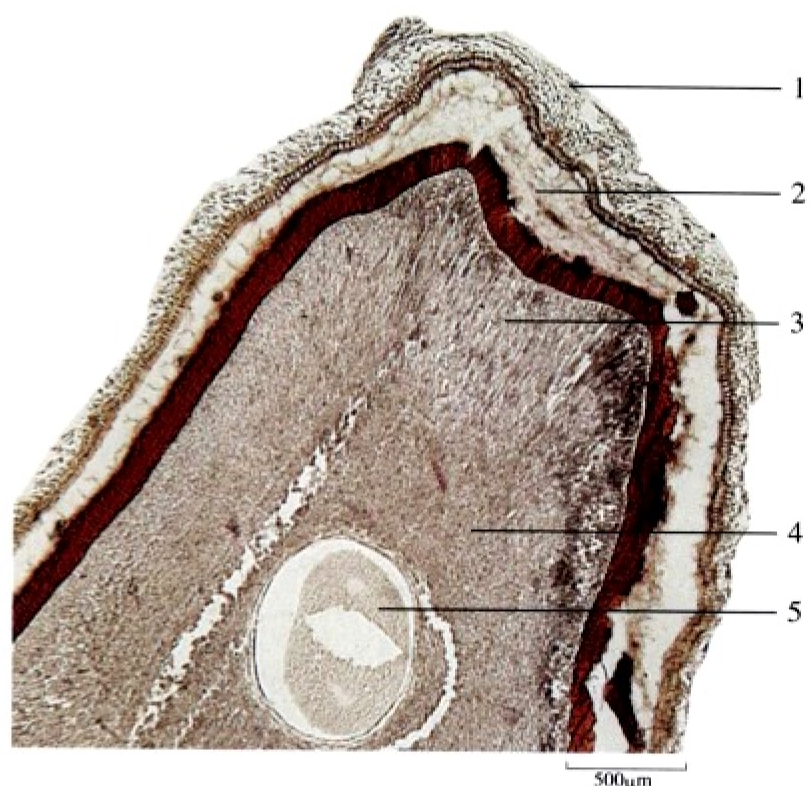
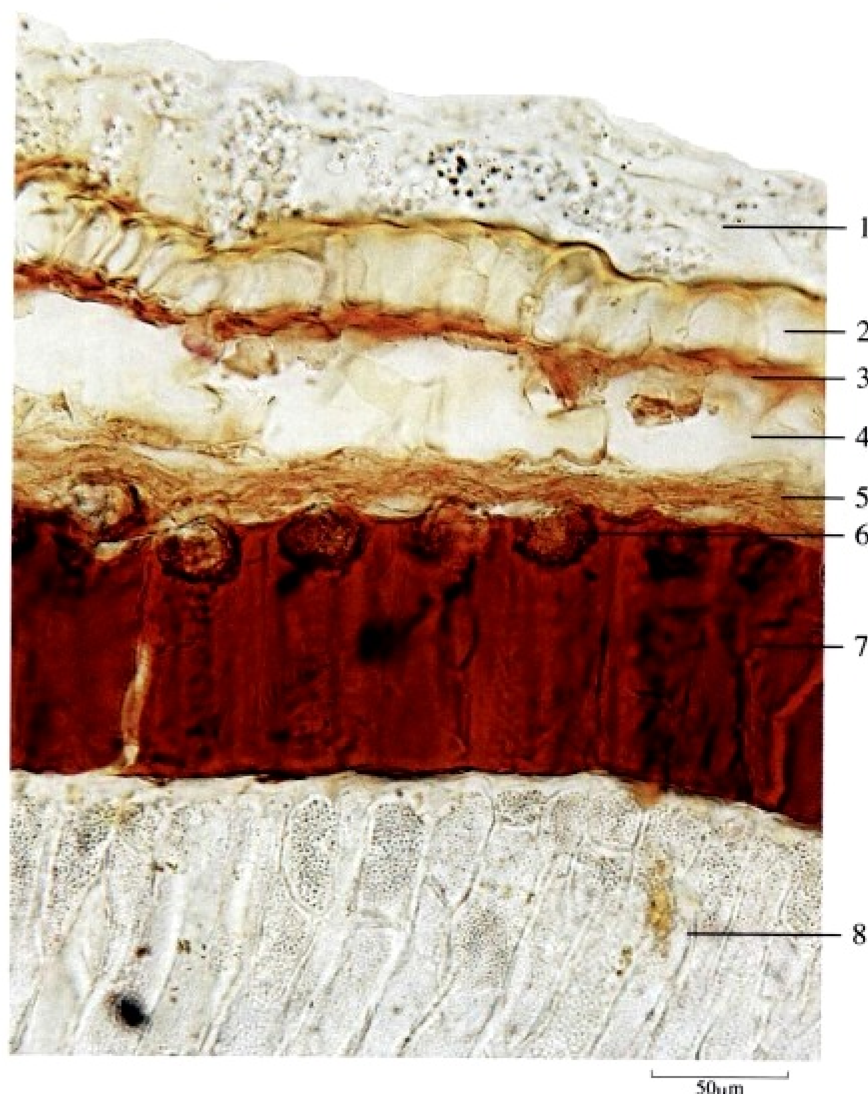


图1　草果（*Amomum tsao-ko* 种子）横切面

[Fig1　Transverse section of seed from *Amomum tsao-ko*]

1. 假种皮（Aril）　2. 种皮（Testa）　3. 外胚乳（Perisperm）　4. 内胚乳（Endosperm）　5. 胚（Embryo）



本品为姜科植物草果*Amomum tsao-ko* Crevost et Lemaire 的干燥成熟果实。

[显微特征]　**本品种子横切面**：假种皮薄壁细胞含淀粉粒。种皮表皮细胞棕色，长方形，壁较厚；下皮细胞1列，含黄色物；油细胞层为1列油细胞，类方形或长方形，切向42～162μm，径向48～68μm，含黄色油滴；色素层为数列棕色细胞，皱缩。内种皮为1列栅状厚壁细胞，棕红色，内壁与侧壁极厚，胞腔小，内含硅质块。外胚乳细胞含淀粉粒及少数细小草酸钙簇晶及方晶。内胚乳细胞含糊粉粒及淀粉粒。（图1、2）

Transverse section of seed: Parenchymatous cells of aril containing starch granules. Epidermal cells of testa brown, rectangular with relatively thick wall, hypodermis consisting of 1 layer of cells containing yellow contents; oil cells 1 layered, subsquare or rectangular, 42～162 μm long tangentially and 48～68 μm long radially, containing yellow oil droplets; pigment layer consisting of several layers of brown cells. Endotesta consisting of 1 layer of palisade sclerenchymatous cells, reddish-brown, with heavily thickened inner and lateral walls, lumina small, containing silica bodies. Perisperm cells containing starch granules and a few small clusters and prisms of calcium oxalate. Endosperm cells containing aleurone granules and starch granules.（Fig 1,2）

图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 假种皮（Aril）　2. 种皮表皮细胞（Epidermal cells of testa）　3. 下皮细胞（Hypodermal cells）　4. 油细胞（Oil cells）　5. 色素层（Pigment layer）　6. 硅质块（Sillica bodies）　7. 内种皮栅状厚壁细胞（Palisade sclerenchymatous cells of endotesta）　8. 外胚乳细胞（Perisperm cells）

茯　苓

Fuling

PORIA

本品为多孔菌科真菌茯苓*Poria cocos* （Schw.） Wolf 的干燥菌核。

[显微特征]　**本品粉末**：灰白色。不规则颗粒状团块及分枝状团块无色，遇水合氯醛液渐溶化。菌丝无色或淡棕色，细长，稍弯曲，有分枝，直径3～8μm，少数至16 μm。（图1）

Powder: Greyish-white. Irregularly granular and branched masses colourless, dissolved gradually on mounting in chloral hydrate solution. Hyphae colourless or pale brown, slender, slightly curved, branched, 3 ~ 8 μm （rarely up to 16 μm） in diameter. （Fig 1）



图1　茯苓　（*Poria cocos* 菌核）　粉末

[Fig1　Powder of sclerotium from *Poria cocos*]

1. 颗粒状及分枝状团块　（Granular and branched masses ）　2. 菌丝（Hyphae）

茺 蔚 子

Chongweizi

FRUCTUS LEONURI

本品为唇形科植物益母草*Leonurus japonicus* Houtt. 的干燥成熟果实。

[显微特征]　本品粉末：黄棕色至深棕色。外果皮细胞横断面观略径向延长，长度不一，形成多数隆起的脊，脊中央为黄色网纹细胞，壁非木化；表面观类多角形，有条状角质纹理，网纹细胞具条状增厚壁。内果皮厚壁细胞断面观略切向延长，内壁极厚，外壁薄，胞腔偏靠外侧，内含草酸钙方晶；表面观呈星状或细胞界限不明显，方晶明显。中果皮细胞表面观类多角形，壁薄，细波状弯曲。种皮表皮细胞类方形，壁稍厚，略波状弯曲，胞腔内含淡黄棕色物。内胚乳细胞含脂肪油滴及糊粉粒（图1）。

Powder: Yellowish-brown to deep brown. Cells of exocarp slightly radially elongated in transverse sectional view, variable in length, forming numerous raised ridges, the cells at the ridge yellow, reticulated and unlignified; subpolygonal in surface view, striated cuticulate, reticulated cells with striated thickened walls. Sclerenchymatous cells of endocarp slightly tangentially elongated in transverse section view, with extremely thickened inner walls, but the outer walls relatively thin, eccentric lumina containing prisms of calcium oxalate; stellate in surface view or borders of cells indistinct, prisms obviously visible. Cells of mesocarp subpolygonal in surface view, with thin and sinuous walls. Epidermal cells of testa subsquare, with slightly thickened and sinuous walls, lumina containing pale yellowish-brown contents. Cells of endosperm containing fixed oil droplets and aleurone grains.（Fig 1）



图1　茺蔚子（*Leonurus japonicus* 果实）粉末

[Fig1　Powder of fruit from *Leonurus japonicus*]

1. 外果皮细胞[Cells of exocarp （a. 断面观Transverse section view　b. 表面观Surface view　c. 角质纹理Cuticulate striations）]　2. 内果皮厚壁细胞[Sclerenchymatous cells of endocarp （a. 断面观Transverse section view　b. 表面观Surface view）]　3. 中果皮细胞（Mesocarp cells）　4. 种皮表皮细胞（Epidermal cells of testa）　5. 内胚乳细胞（Cells of endosperm）

胡　芦　巴

Huluba

SEMEN TRIGONELLAE

本品为豆科植物胡芦巴*Trigonella foenum-graecum* L.的干燥成熟种子。

[显微特征]　**本品粉末**：棕黄色。表皮栅状细胞1列，外壁及侧壁上部较厚，有细密纵沟纹，下部胞腔较大，具光辉带；表面观类多角形，壁较厚，胞腔较小。支持细胞1列，略呈哑铃状，上端稍窄，下端较宽，垂周壁显条状纹理；底面观呈类圆形或六角形，有密集的放射状条纹增厚，似菊花纹状，胞腔明显。子叶细胞含糊粉粒及脂肪油滴。(图1)

Powder: Yellowish-brown. Palisade cells of epidermis 1 1ayer, with thickened outer and upper lateral walls possessing fine and close longitudinal pit-cannals, relatively large lumina at the lower part and bearing a line of light band; the surface view polygonal, with relatively thickened walls and small lumina. Supporting cells 1 layer, somewhat dumbbell-shaped, narrow at the upper end but broader at the lower end and the anticlinal walls with linear striations; the bottom view subrounded or hexagonal, with dense and radiate thickened stripes in chrysanthemum-shaped form, lumina obvious. Cotyledon cells containing aleurone grains and fatty oil droplets. (Fig 1)

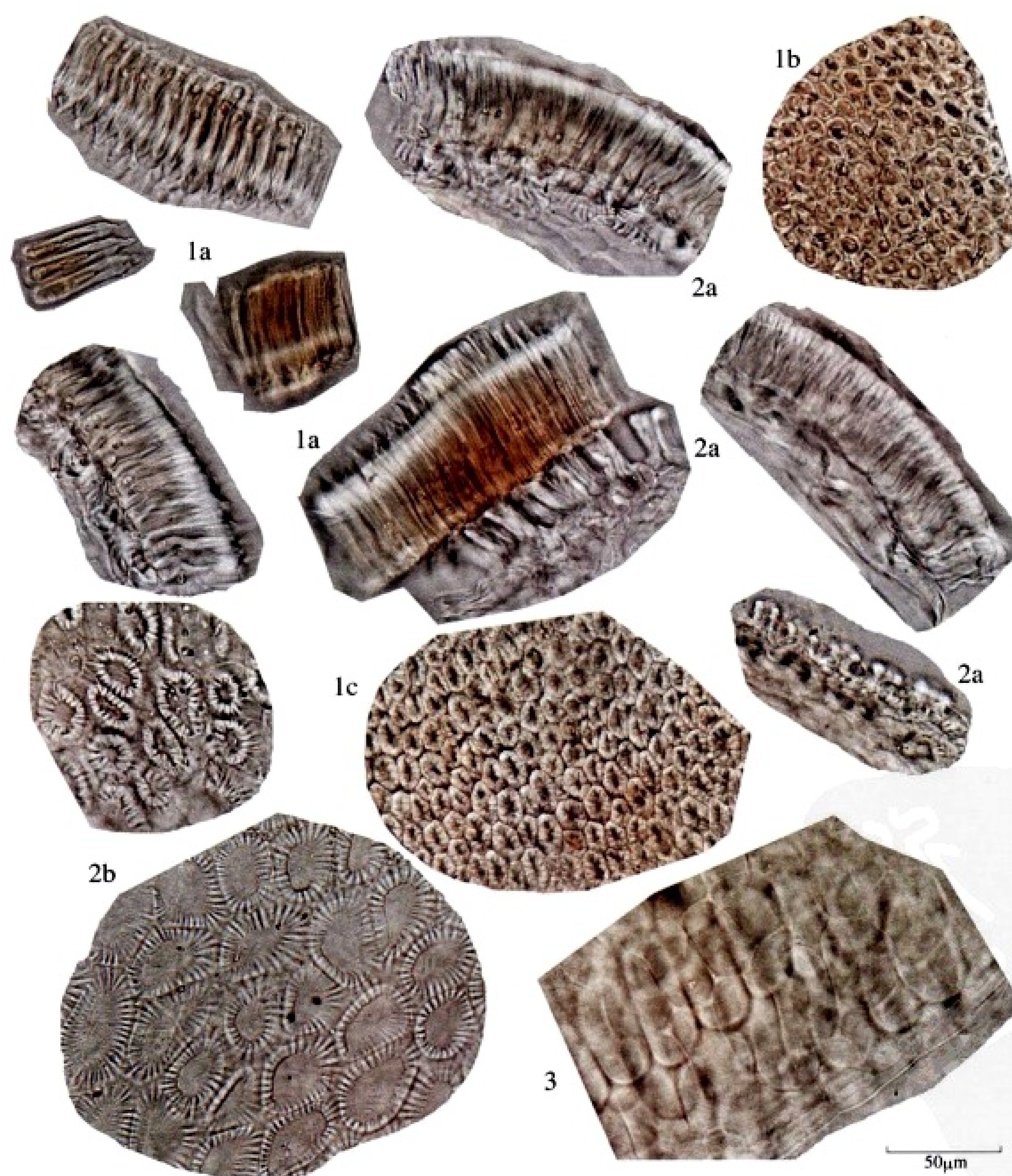


图1　胡芦巴（*Trigonella foenum-graecum* 种子）粉末

[Fig1　Powder of seed from *Trigonella foenum-graecum*]

1. 种皮表皮栅状细胞 [Palisade cells of epidermis（a. 侧面观Lateral view　b. 表面观Surface view　c. 底面观Bottom view）]

2. 支持细胞 [Supporting cells（a. 侧面观Lateral view　b. 底面观Bottom view）]　3. 子叶细胞（Cotyledon cells）

胡　椒

Hujiao

FRUCTUS PIPERIS

本品为胡椒科植物胡椒*Piper nigrum* L. 的干燥近成熟或成熟果实。

[显微特征]　**黑胡椒粉末**：暗灰色。外果皮石细胞类方形、长方形或形状不规则，直径19～66μm，壁较厚。内果皮石细胞表面观类多角形，直径20～30μm；侧面观方形，壁一面薄。种皮细胞棕色，多角形，壁连珠状增厚。油细胞较少，类圆形，直径51～75μm。淀粉粒细小，常聚集成团块。（图1）

Powder of Black Pepper: Dark grey. Stone cells of exocarp subsquare, rectangular or irregular, 19 ~ 66 μm in diameter, walls relatively thickened. Stone cells of endocarp subpolygonal in surface view, 20 ~ 30 μm in diameter; square in lateral view, walls thin at one side . Cells of testa brown, polygonal, with beaded walls. Oil cells relatively less, subrounded, 51 ~ 75 μm in diameter. Starch granules small, often grouped into masses. (Fig 1)

白胡椒粉末：黄白色。种皮细胞、油细胞、淀粉粒同黑胡椒。

Powder of White Pepper: Yellowish-white. The characters of testa cells, oil cells and starch granules as described under powder of Black Pepper.

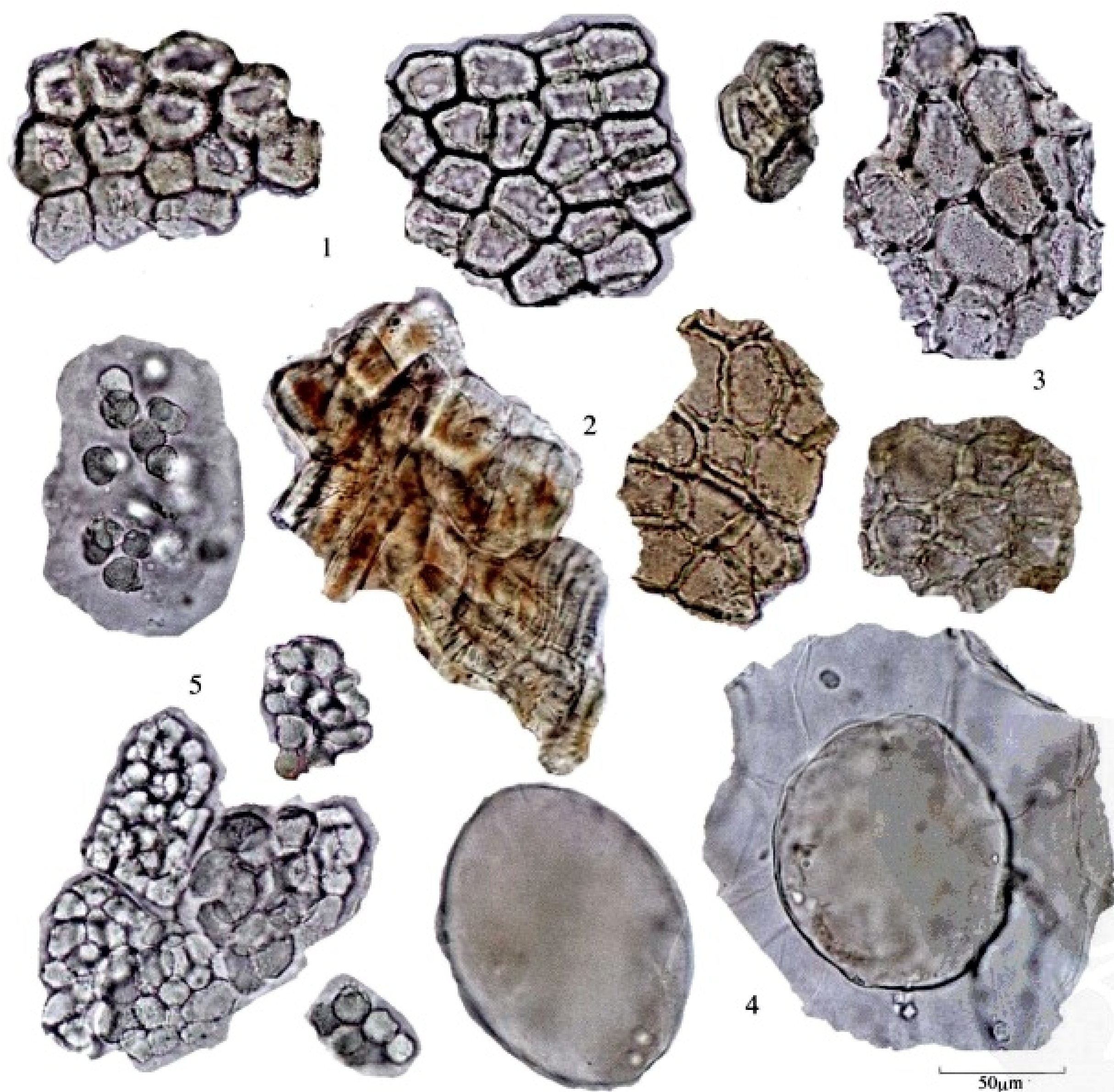


图1　胡椒（*Piper nigrum* 果实）粉末

[Fig1　Powder of fruit from *Piper nigrum*]

1. 外果皮石细胞（Stone cells of exocarp）　2. 内果皮石细胞（Stone cells of endocarp）　3. 种皮细胞（Cells of testa）　4. 油细胞（Oil cells）　5. 淀粉粒（Starch granules）

荔 枝 核
Lizhihe
SEMEN LITCHI

本品为无患子科植物荔枝*Litchi chinensis* Sonn. 的干燥成熟种子。

[显微特征] **本品粉末**：棕黄色。镶嵌层细胞黄棕色，呈长条形，由数个细胞为一组，作不规则方向嵌列。星状细胞淡棕色，呈不规则星状分枝，分枝先端平截或稍钝圆，细胞间隙大，壁薄。石细胞成群或单个散在，呈类圆形、类方形、类多角形、长方形或长圆形，多有突起或分枝。子叶细胞呈类圆形或类圆多角形，充满淀粉粒，并可见棕色油细胞。（图1）

Powder: Brownish-yellow. Cells of parquet layer yellowish-brown, stripe-shaped, several cells grouped in irregular mosaics. Stellate cells brownish, irregular stellately branched, truncate or relatively obtuse at the apex of branches, intercellular space wide, walls thin. Stone cells in groups or scattered singly, subrounded, subsquare, subpolygonal, rectangle or oval, most protruded or branched. Cotyledon cells subrounded or subpolyangular, filled with starch granules, brown oil cells visible. (Fig 1)



图1 荔枝核（*Litchi chinensis* 种子） 粉末

[Fig1 Powder of seed from *Litchi chinensis*]

1. 镶嵌层细胞（Cells of parquet） 2. 星状细胞（Stellate cells） 3. 石细胞（Stone cells） 4. 子叶细胞（Cotyledon cells）

南　沙　参
Nanshashen
RADIX ADENOPHORAE

本品为桔梗科植物轮叶沙参*Adenophora tetraphylla*（Thunb.）Fisch. 或沙参*Adenophora stricta* Miq. 的干燥根。

[显微特征]　**本品粉末**：灰黄色。木栓石细胞类长方形、长条形、类椭圆形、类多边形，长18～155μm，宽18～61μm，有的垂周壁连珠状增厚。有节乳管常连接成网状。菊糖结晶扇形、类圆形或不规则形。（图1）

Powder: Greyish-yellow. Stone cells in cork subrectangular, strip-shaped, subellipsoidal or subpolygonal, 18 ~ 155 μm long, 18 ~ 61 μm wide, some anticlinal walls beaded. Articulate laticiferous tubes often linked reticularly. Inulins fan-shaped, subrounded or irregular.（Fig 1）

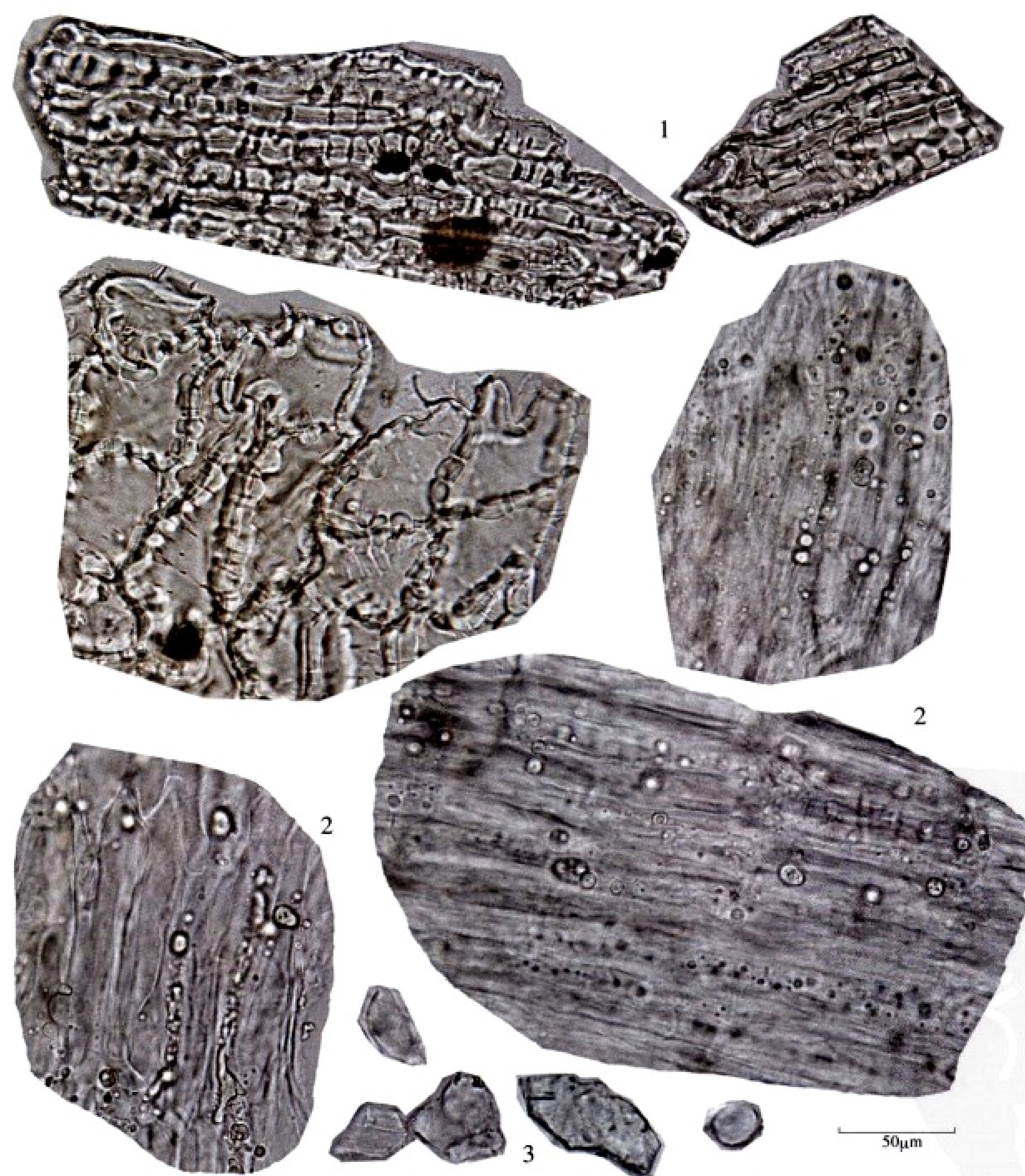


图1　南沙参（*Adenophora tetraphylla* 根）粉末

[Fig1　Powder of root from *Adenophora tetraphylla*]

1. 石细胞（Stone cells）　2. 乳管（Laticiferous tubes）　3. 菊糖（Inulins）

南板蓝根

Nanbanlangen

RHIZOMA ET RADIX BAPHICACANTHIS CUSIAE

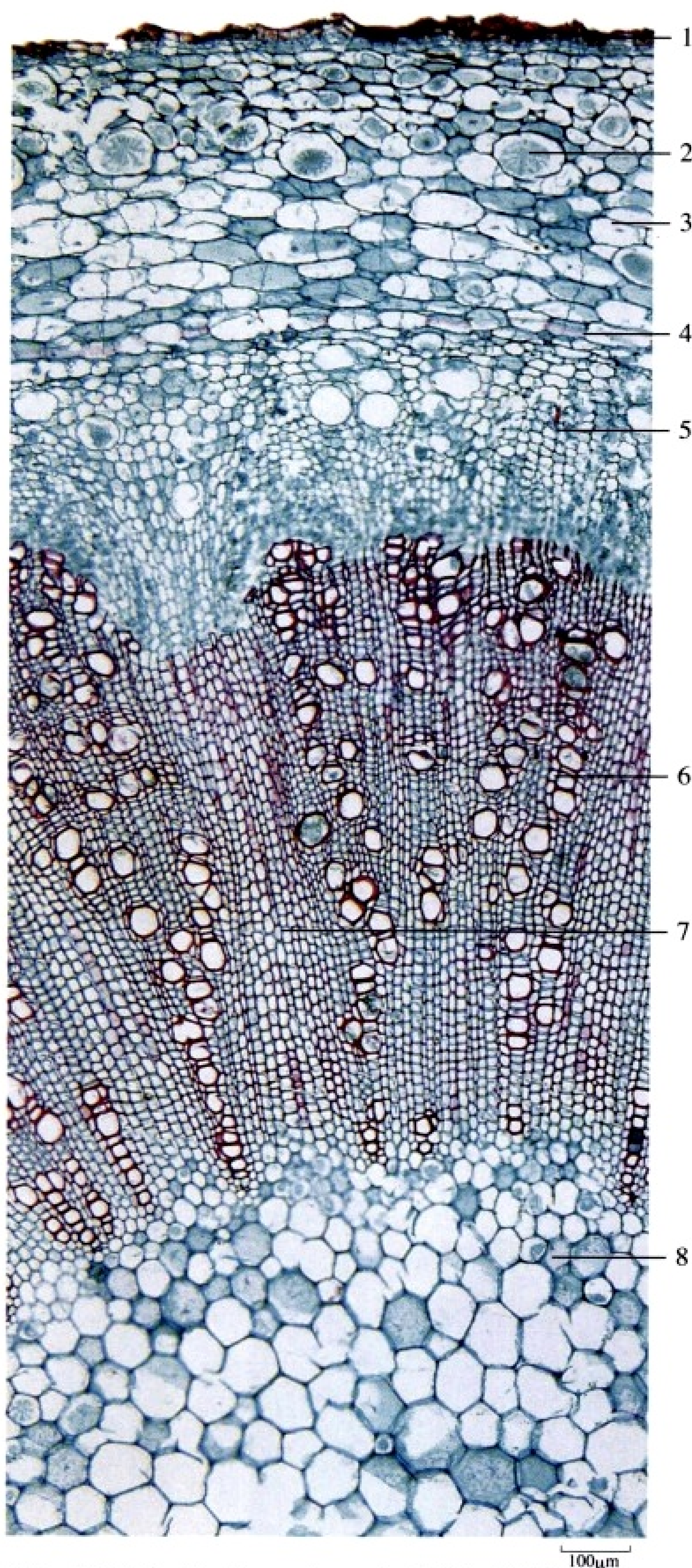


图1 南板蓝根（*Baphicacanthus cusia* 根茎） 横切面

[Fig1 Transverse section of rhizome from *Baphicacanthus cusia*]

1. 木栓层（Cork） 2.含钟乳体薄壁细胞（Parenchymatous cells containing cystoliths） 3. 皮层（Cortex） 4. 内皮层（Endodermis） 5. 韧皮部（Phloem） 6. 木质部（Xylem） 7. 木射线（Xylem rays） 8. 髓（Pith）

本品为爵床科植物马蓝*Baphicacanthus cusia*（Nees）Bremek. 的干燥根茎及根。

[显微特征]　本品根茎的横切面：木栓层为数列细胞，内含棕色物。皮层宽广，外侧为数列厚角细胞；内皮层明显；可见石细胞。韧皮部较窄，韧皮纤维众多。木质部宽广，细胞均木化；导管单个或2～4个径向排列；木射线较宽。髓部细胞类圆形或多角形，偶见石细胞。薄壁细胞中含有椭圆形的钟乳体。（图1、2）

Transverse section of rhizome: Cork consisting of several layers of cells, containing brown contents. Cortex relatively broad, having serveral layers of collenchyma cells outside; endodermis distinct; stone cells visible. Phloem relatively narrow, phloem fibres more frequent. Xylem broad, all cells lignified; vessels single or 2～4 in groups, arranged radially; xylem rays relatively broad. In pith cells subrounded or polygonal, stone cells found occasionally. Some parenchymatous cells containing elliptical cystoliths. (Fig 1,2)

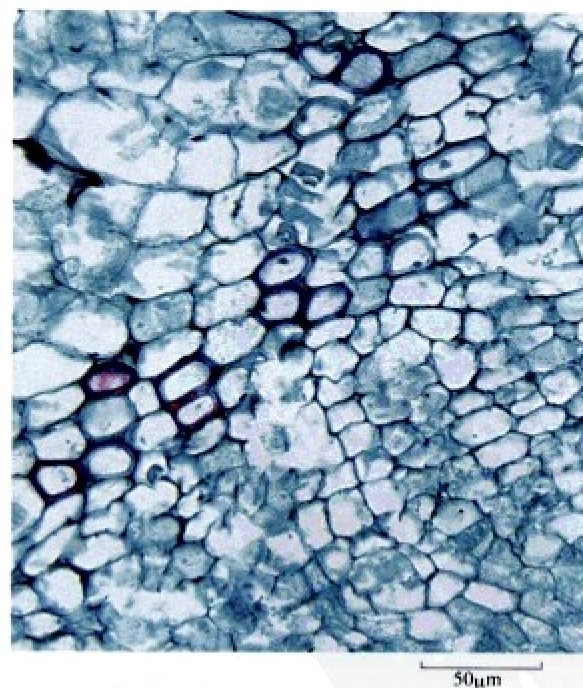


图2 示韧皮纤维

[Fig2 Showing phloem fibres]

南 鹤 虱

Nanheshi

FRUCTUS CAROTAE

本品为伞形科植物野胡萝卜*Daucus carota* L.的干燥成熟果实。

[显微特征]　本品分果横切面：外果皮细胞1列，主棱处有分化成单细胞的非腺毛，毛长86～390μm。中果皮有大型油管，在次棱基部各1个，接合面2个，扁长圆形，直径50～120μm，内含黄棕色油滴；主棱内侧有细小维管束。内果皮为1列扁平薄壁细胞。种皮细胞含红棕色物质。胚乳丰富，薄壁细胞多角形，壁稍厚，含脂肪油及糊粉粒，糊粉粒中含有细小草酸钙簇晶。（图1、2）

Transverse section of mericarp: Exocarp consisting of 1 layer of cells, the cells at the main rib differentiating to unicellular non-glandular hairs, hairs 86～390 μm long. Large vittae occurring in mesocarp, 1 at the base of each subrib and 2 in the commissural surface; vittae flattened oblong, 50～120 μm in diameter, containing yellowish-brown oil droplets; inner side of mainribs with fine vascular bundles. Endocarp consisting of 1 layer of flattened parenchymatous cells. Cells of testa containing reddish-brown contents. Endosperm abundant, parenchymatous cells polygonal, with slightly thickened walls, containing fatty oil and aleurone grains with minute clusters of calcium oxalate. （Fig 1,2）

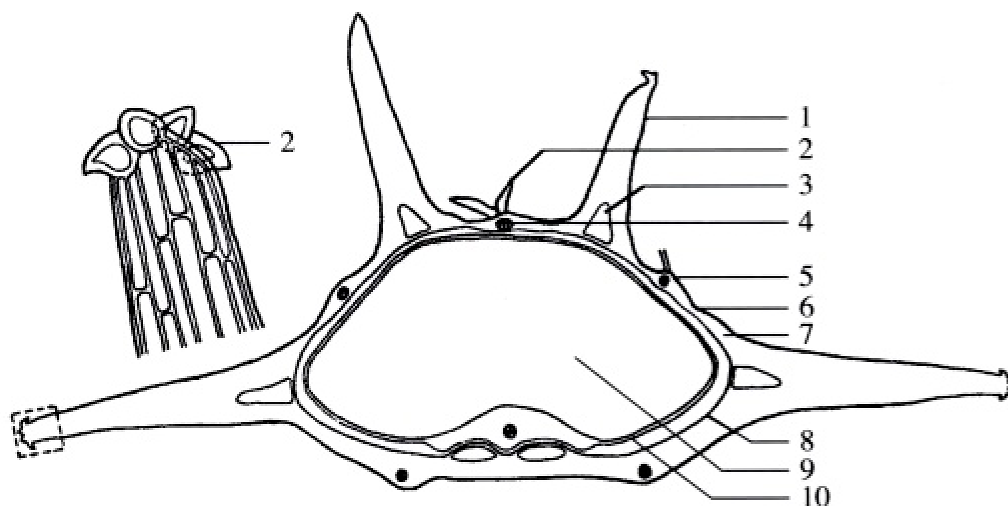


图1　南鹤虱（*Daucus carota* 分果）横切面简图

[Fig1　General picture of transverse section of mericarp from *Daucus carota*]

1. 次棱（Subribs）　2. 非腺毛（Non-glandular hairs）　3. 油管（Vitta）　4. 维管束（Vascular bundles）　5. 主棱（Mainribs）　6. 外果皮（Exocarp）　7. 中果皮（Mesocarp）　8. 内果皮（Endocarp）　9. 胚乳（Endosperm）　10. 种皮（Testa）

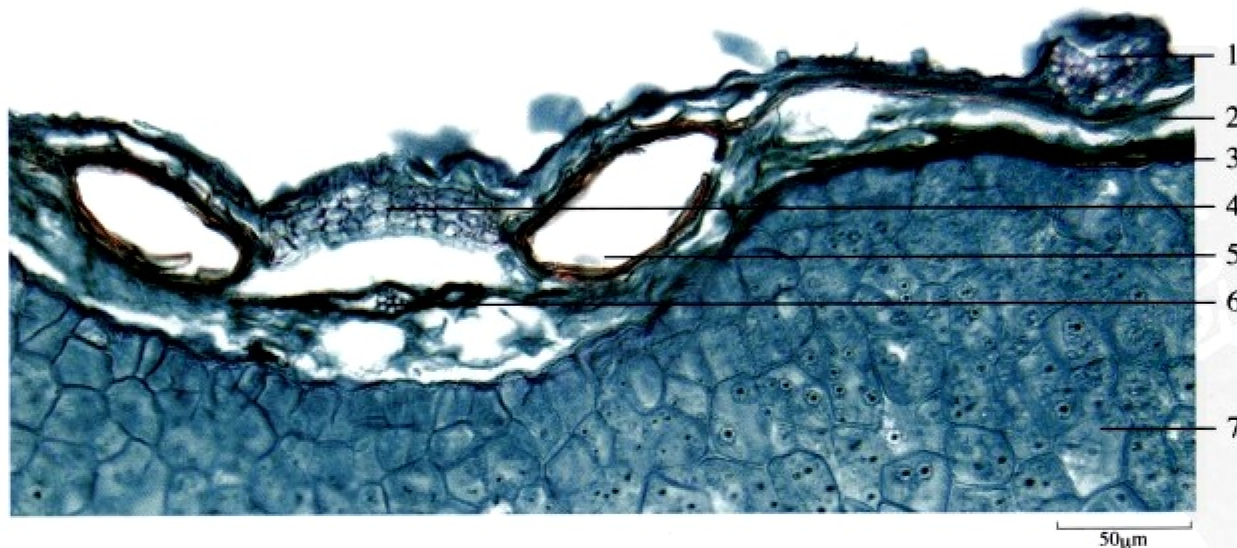


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 维管束（Vascular bundle）　2. 中果皮（Mesocarp）　3. 种皮细胞（Testa cells）　4. 纤维束（Fibre bundles）　5. 油管（Vitta）　6. 导管（Vessels）　7. 胚乳细胞（Endosperm cells）

枳　　壳

Zhiqiao

FRUCTUS AURANTII

本品为芸香科植物酸橙*Citrus aurantium* L. 及其栽培变种的干燥未成熟果实。

[显微特征]　本品粉末：黄白色或棕黄色。中果皮细胞类圆形或形状不规则，壁大多呈不均匀增厚。果皮表皮细胞表面观多角形、类方形或长方形，气孔环式，直径16～34μm，副卫细胞5～9个；侧面观外被角质层。汁囊组织淡黄色或无色，细胞多皱缩，并与下层细胞交错排列。草酸钙方晶存在于果皮和汁囊细胞中，呈斜方形、多面体形或双锥形，直径3～30μm。螺纹、网纹导管和管胞细小。（图1）

Powder: Yellowish-white or brownish-yellow. Cells of mesocarp subrounded or irregular, most cell walls unevenly thickened. Epidermal cells of pericarp polygonal, subsquare or rectangular in surface view; stomata subrounded, 16～34 μm in diameter, subsidiary cells 5～9, covered with cuticle in lateral view. Juicy sac tissues pale yellow or colourless, shrunken, crisscross with the under layer cells. Prisms of calcium oxalate existing in cells of pericarp and Juicy sac, rhombic, polygonal or biconical, 3～30 μm in diameter. Spiral and reticulated vessels and tracheids small.（Fig 1）

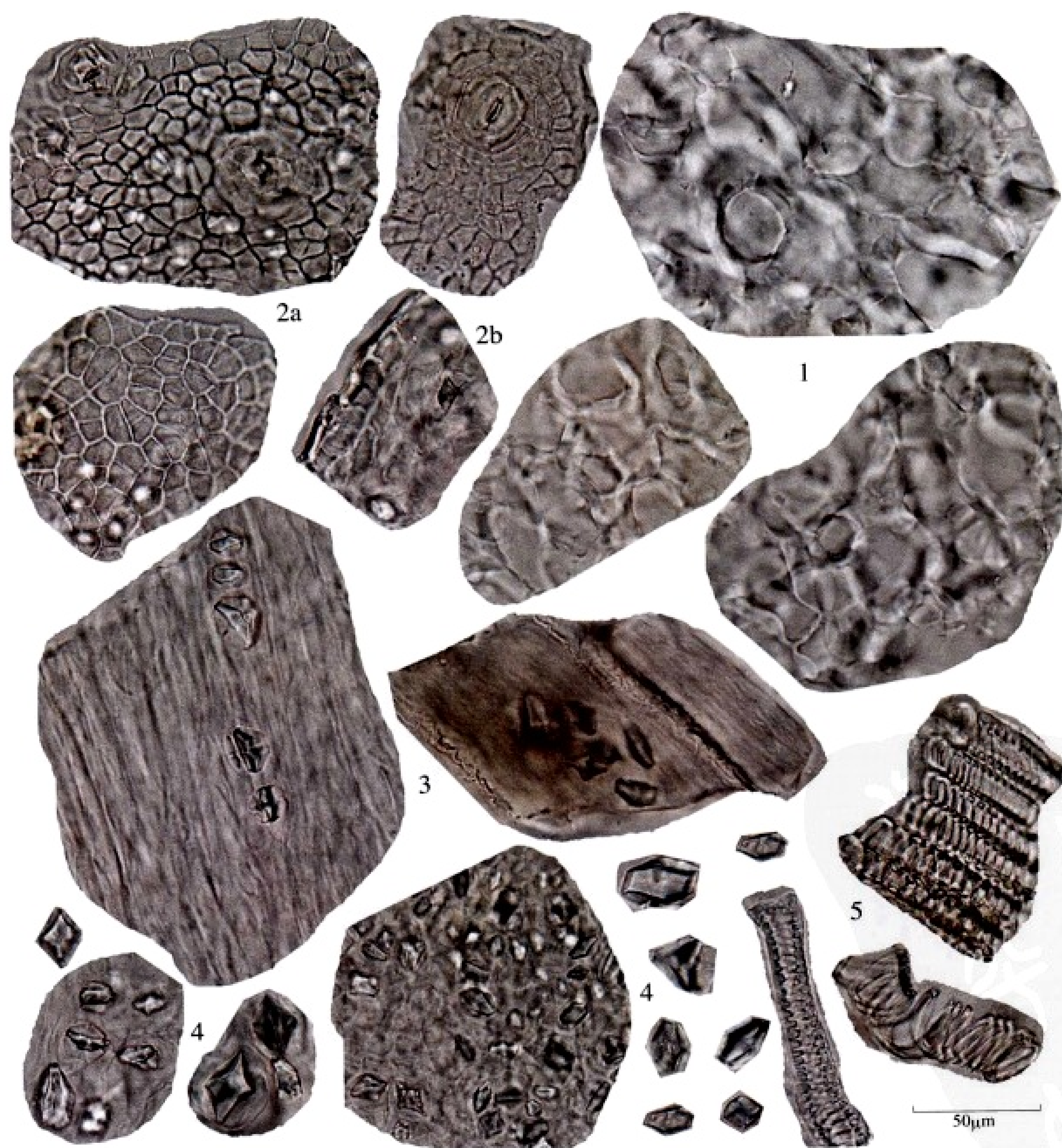


图1　枳壳（*Citrus aurantium* 未成熟果实）粉末

[Fig1　Powder of fruit from *Citrus aurantium*]

1. 中果皮细胞（Mesocarp cells）　2. 果皮表皮细胞[Epidermal cells of pericarp　（a. 表面观Surface view　b. 断面观 Section view）]　3. 汁囊组织（Juicy sac tissues）　4. 草酸钙方晶（Prisms of calcium oxalate）　5. 导管（Vessels）

枳　实

Zhishi

FRUCTUS AURANTII IMMATURUS

本品为芸香科植物酸橙*Citrus aurantium* L. 及其栽培变种或甜橙*Citrus sinensis* Osbeck 的干燥幼果。

[显微特征]　**本品粉末**：淡黄色或棕黄色。中果皮细胞类圆形或形状不规则，壁大多呈不均匀增厚。果皮表皮细胞表面观多角形、类方形或长方形，气孔环式，直径18～26μm，副卫细胞5～9个；侧面观外被角质层。草酸钙方晶存在于果皮和汁囊细胞中，呈斜方形、多面体形或双锥形，直径2～24μm。橙皮苷结晶存在于薄壁细胞中，黄色或无色，呈圆形或无定形团块，有的显放射状纹理。油室碎片多见，分泌细胞狭长而弯曲。螺纹、网纹导管和管胞细小。（图1）

Powder: Pale yellow or brownish-yellow. Cells of mesocarp subrounded or irregular, most cell walls unevenly thickened. Epidermal cells of pericarp polygonal, subsquare or rectangular in surface view, stomata subrounded, 18 ~ 26 μm in diameter, subsidiary cells 5 ~ 9; covered with cuticle in lateral view. Prisms of calcium oxalate existing in cells of pericarp and juicy sac, rhombic, polygonal or biconical, 2 ~ 24 μm in diameter. Hesperidin crystals contained in parenchymatous cells, yellow or colourless, in rounded or amorphous masses, some with radial striations. Fragments of oil cavities abundant, secretory cells slender and curved. Spiral and reticulated vessels and tracheids small. (Fig 1)



图1　枳实（*Citrus aurantium* 幼果）粉末

[Fig1　Powder of young fruit from *Citrus aurantium*]

1. 中果皮细胞（Mesocarp cells）　2. 果皮表皮细胞[Epidermal cells of pericarp（a. 表面观Surface view　b. 断面观Section view）]　3. 草酸钙方晶（Prisms of calcium oxalate）　4. 橙皮苷结晶（Hesperidin crystals）　5. 油室碎片（Fragments of oil cavities）　6. 导管（Vessels）

栀　　子

Zhizi

FRUCTUS GARDENIAE

本品为茜草科植物栀子*Gardenia jasminoides* Ellis的干燥成熟果实。

[显微特征]　**本品粉末：**红棕色。内果皮石细胞类长方形、类圆形或类三角形，常上下层交错排列或与纤维连结，直径14～34 μm，长约至75 μm，壁厚4～13 μm；胞腔内常含草酸钙方晶。内果皮纤维细长，梭形，直径约10 μm，长约至110 μm，常交错、斜向镶嵌状排列。种皮石细胞黄色或淡棕色，长多角形、长方形或形状不规则，直径60～112 μm，长至230 μm，壁厚，纹孔甚大，胞腔棕红色。草酸钙簇晶直径19～34 μm。（图1）

Powder: Reddish-brown. Stone cells of endocarp subrectangular, subrounded or subtriangular, often interlaced with conjoint layers or linked with fibres, 14～34 μm in diameter, about 75 μm long, 4～13 μm in wall thickness, lumina mostly containing prisms of calcium oxalate. Fibres of endocarp long and thin, fusiform, about 10 μm in diameter, up to 110 μm long, often crossbeddedly and obliquely arranged in mosaic patterns. Stone cells of testa yellow or pale brown, elongated polygonal, rectangular or irregular in shape, 60～112 μm in diameter, up to 230 μm long, with pitted and thickened walls, lumina brownish-red. Clusters of calcium oxalate 19～34 μm in diameter. （Fig 1）



图1　栀子（*Gardenia jasminoides* 果实）粉末

[Fig1　Powder of fruit from *Gardenia jasminoides*]

1. 内果皮石细胞（Stone cells of endocarp）　2. 内果皮纤维（Fibres of endocarp）　3. 种皮石细胞（Stone cells of testa）　4. 草酸钙簇晶（Clusters of calcium oxalate）

枸 杞 子

Gouqizi

FRUCTUS LYCII

本品为茄科植物宁夏枸杞*Lycium barbarum* L. 的干燥成熟果实。

[显微特征] **本品粉末**：黄橙色或红棕色。外果皮表皮细胞表面观呈类多角形或长多角形，垂周壁平直或细波状弯曲，外平周壁表面有平行的角质条纹。中果皮薄壁细胞呈类多角形，壁薄，胞腔内含橙红色或红棕色球形颗粒。种皮石细胞表面观不规则多角形，壁厚，波状弯曲，层纹清晰。(图1)

Powder: Yellowish-orange or reddish-brown. Epidermal cells of exocarp polygonal or elongated polygonal in surface view, anticlinal walls straight or wave curved, with cuticle striations. Parenchymatous cells of mesocarp subpolygonal, thin-walled, lumina containing orangish-red or reddish-brown spherotical granules. Stone cells of testa irregular polygonal, walls thickened, curved, striations distinct. (Fig 1)



图1 枸杞子（*Lycium barbarum* 果实）粉末

[Fig1 Powder of fruit from *Lycium barbarum*]

1. 外果皮表皮细胞（Epidermal cells of exocarp） 2. 中果皮薄壁细胞（Parenchymatous cells of mesocarp） 3. 种皮石细胞 [Stone cells of testa（a. 表面观Surface view b. 断面观Section view）]

枸 骨 叶

Gouguye

FOLIUM ILICIS CORNUTAE

本品为冬青科植物枸骨*Ilex cornuta* Lindl. ex Paxt. 的干燥叶。

[显微特征]　本品叶片近基部横切面：上表皮细胞类方形，壁厚，外被厚的角质层，主脉处有单细胞非腺毛；下表皮细胞略小，可见气孔。栅栏组织为2～4列细胞，海绵组织疏松；主脉处上、下表皮内为1至数列厚角细胞。主脉维管束外韧型，其上、下方均具木化纤维群。叶缘表皮内常依次为厚角细胞及石细胞半环带，再内为木化纤维群；叶缘近叶柄处仅有数列厚角细胞，近基部以上渐无厚角组织。叶缘表皮内及主脉处下表皮内厚角组织中偶有石细胞，韧皮部下方的纤维群外亦偶见。薄壁组织及下表皮细胞常含草酸钙簇晶。（图1，2）

Transverse section at the base of leaf: Upper epidermal cells subsquare, thick-walled, covered with a thick cuticle, bearing unicellular non-glandular hairs near midrib. Lower epidermal cells relatively small, stomata visible. Palisade tissue of 2 ~ 4 layers of cells; spongy tissue loose. 1 to several layers of collenchymatous cells occurring inside the upper and lower epidermis at midrib. Vascular bundle of midrib collateral, with lignified fibre groups above and below the vascular bundle. Collenchymatous cells, stone cells in semi-ring and lignified fibre groups sequently occurring inside the epidermis of leaf margin; several layers of collenchymatous cells at the margin near the petiole, absent above the base. Stone cells occasionally occurring in the collenchyma inside the epidermis of margin and the lower epidermis of midrib, and outside the fibre groups below the phloem. Parenchyma and lower epidermal cells frequently containing clusters of calcium oxalate.（Fig 1, 2）

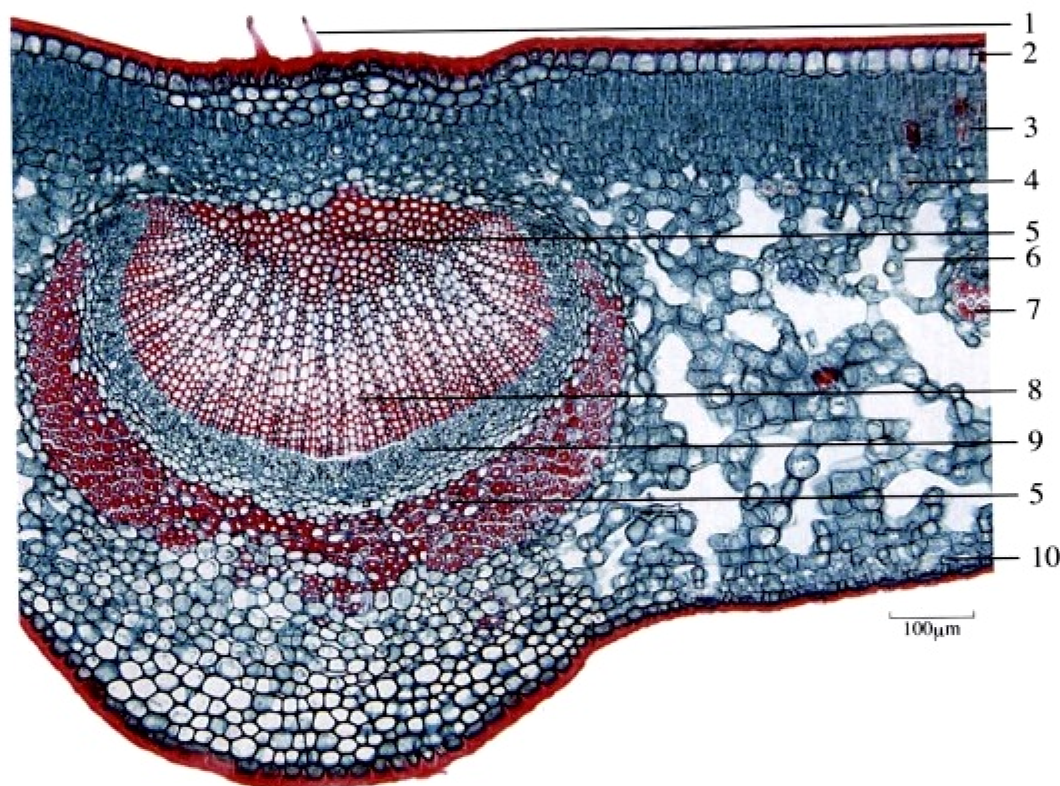


图1　枸骨叶（*Ilex cornuta* 叶）横切面

[Fig1　Transverse section of leaf of *Ilex cornuta*]

1. 非腺毛（Non-glandular hairs）　2. 上表皮（Upper epidermis）　3. 栅栏组织（Palisade tissue）　4. 草酸钙簇晶（Clusters of calcium oxalate）　5. 木化纤维群（Lignified fibre groups）　6. 海绵组织（Spongy tissue）　7. 纤维束（Fibre bundles）　8. 木质部（Xylem）　9. 韧皮部（Phloem）　10. 下表皮（Lower epidermis）

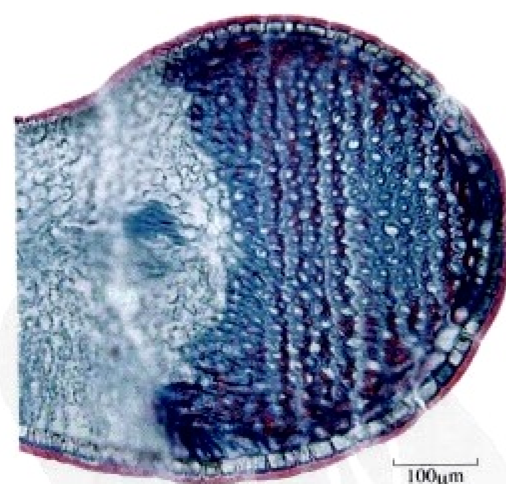


图2　示叶缘部分

[Fig2　Showing structure of leaf edge]

本品为毛茛科植物威灵仙*Clematis chinensis* Osbeck、棉团铁线莲*Clematis hexapetala* Pall. 或东北铁线莲*Clematis manshurica* Rupr. 的干燥根及根茎。

[显微特征]　本品根横切面：威灵仙表皮细胞外壁增厚，棕黑色。皮层宽，均为薄壁细胞，外皮层细胞切向延长；内皮层明显。韧皮部外侧常有纤维束及石细胞，纤维直径18～43μm。形成层明显。木质部全部木化。薄壁细胞含淀粉粒。（图1、2）

Transverse section of root:

Clematis chinensis: The outer walls of epidermal cells thickened, brownish-black. Cortex broad, consisting of parenchymatous cells, exodermis cells tangentially elongated; endodermis distinct. The outer side of phloem usually exhibiting fibre bundles and stone cells, fibres 18 ~ 43 μm in diameter. Cambium distinct. Xylem completely lignified. Parenchymatous cells containing starch granules.（Fig 1,2）

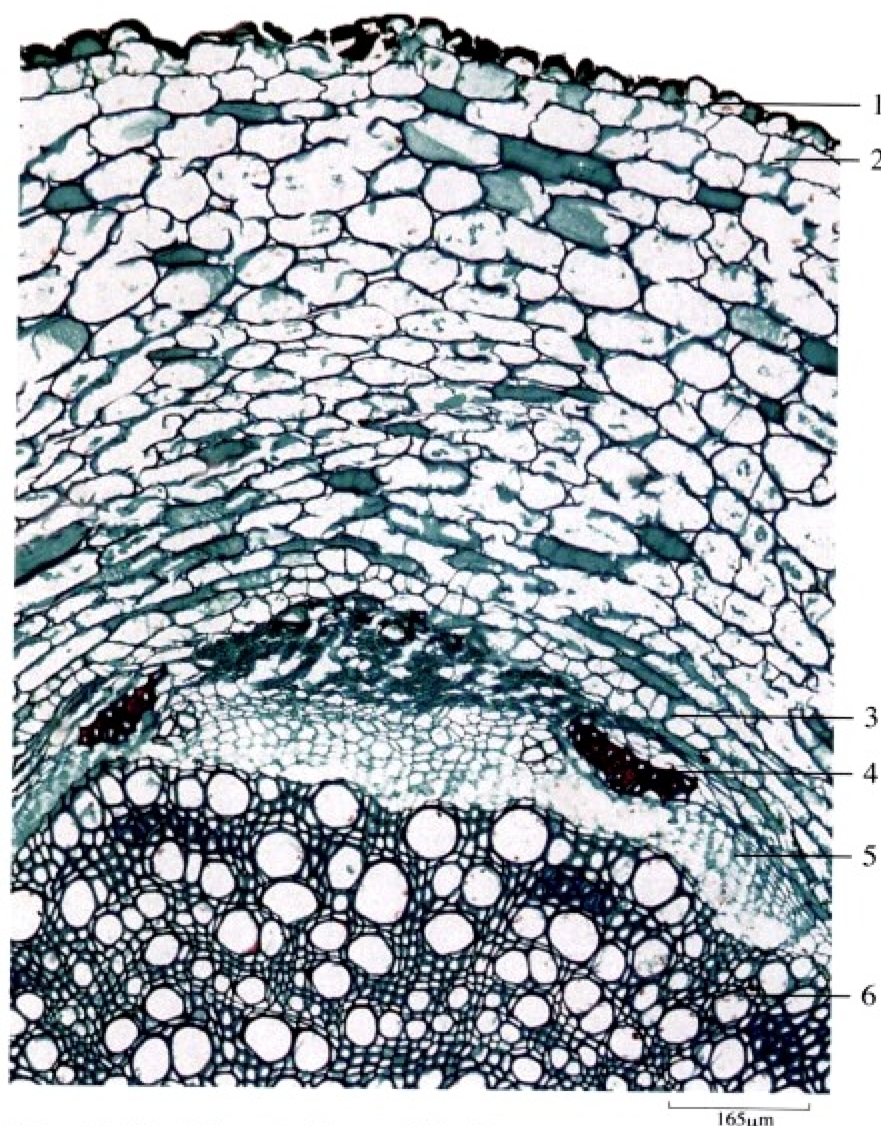


图1　威灵仙（*Clematis chinensis* 根）横切面

[Fig1　Transverse section of root from *Clematis chinensis*]

1. 表皮细胞(Epidermal cells)　2. 外皮层(Exodermis)　3. 内皮层(Endodermis)　4. 纤维束（Fibre bundle）　5. 韧皮部（Phloem）　6. 木质部（Xylem）

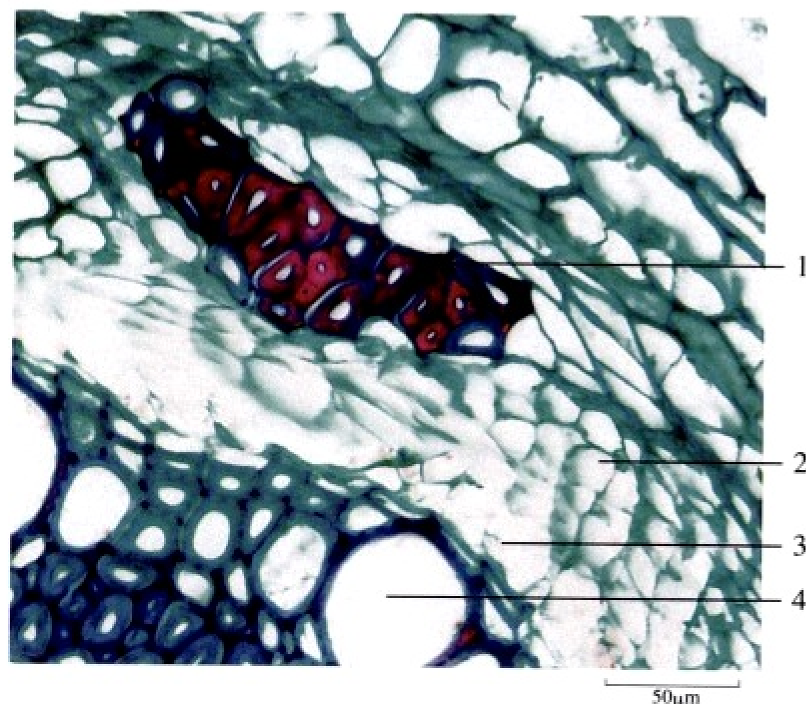


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 纤维束（Fibre bundle）　2. 韧皮部（Phloem）　3. 形成层（Cambium）　4. 木质部（Xylem）

东北铁线莲 外皮层细胞径向延长，老根略切向延长。韧皮部外侧偶有纤维及石细胞（图3）。

Clematis manshurica: Exodermis cells radially elongated, slightly tangentially elongated in the older roots; occasionally the outer side of phloem exhibiting fibre bundles and stone cells. (Fig 3)

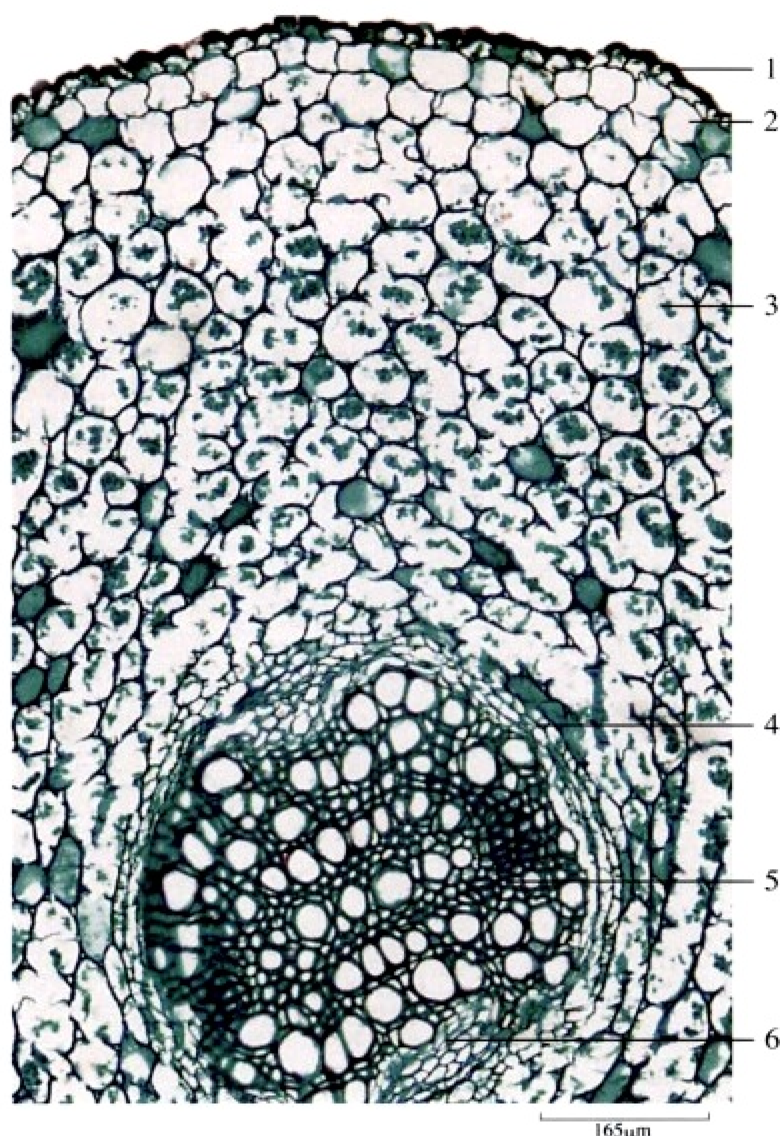
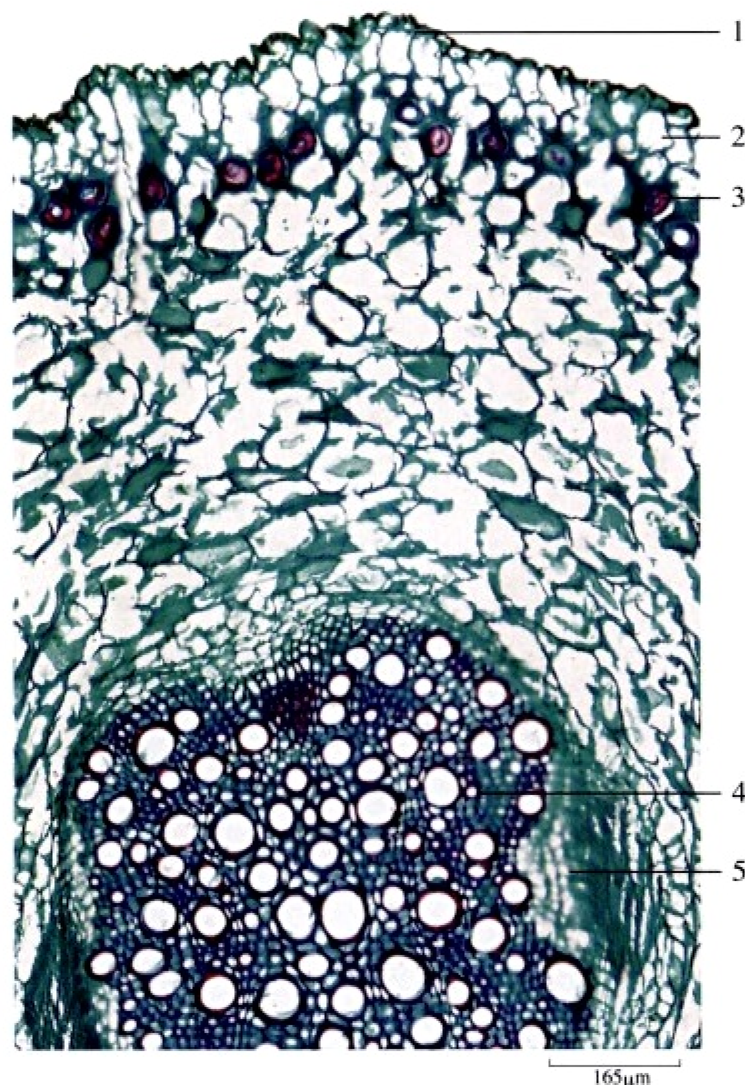


图3 威灵仙（*Clematis manshurica* 根）横切面

[Fig3 Transverse section of root from *Clematis manshurica*]

1. 表皮细胞（Epidermal cells） 2. 外皮层（Exodermis） 3. 皮层（Cortex） 4. 内皮层（Endodermis） 5. 木质部（Xylem） 6. 韧皮部（Phloem）



棉团铁线莲 外皮层细胞多径向延长，紧接外皮层的1～2列细胞壁稍增厚。韧皮部外侧无纤维束及石细胞（图4）。

Clematis hexapetala: Exodermis cells mostly radially elongated, and the 1～2 layers of cells next to the exodermis with slightly thickened walls; the outer side of phloem without fibre bundles and stone cells. (Fig4)

图4 威灵仙（*Clematis hexapetala* 根）横切面

[Fig4 Transverse section of root from *Clematis hexapetala*]

1. 表皮细胞（Epidermal cells） 2. 外皮层（Exodermis） 3. 厚壁细胞（Sclerenchymatous cells） 4. 木质部（Xylem） 5. 韧皮部（Phloem）

厚　朴
Houpo
CORTEX MAGNOLIAE OFFICINALIS

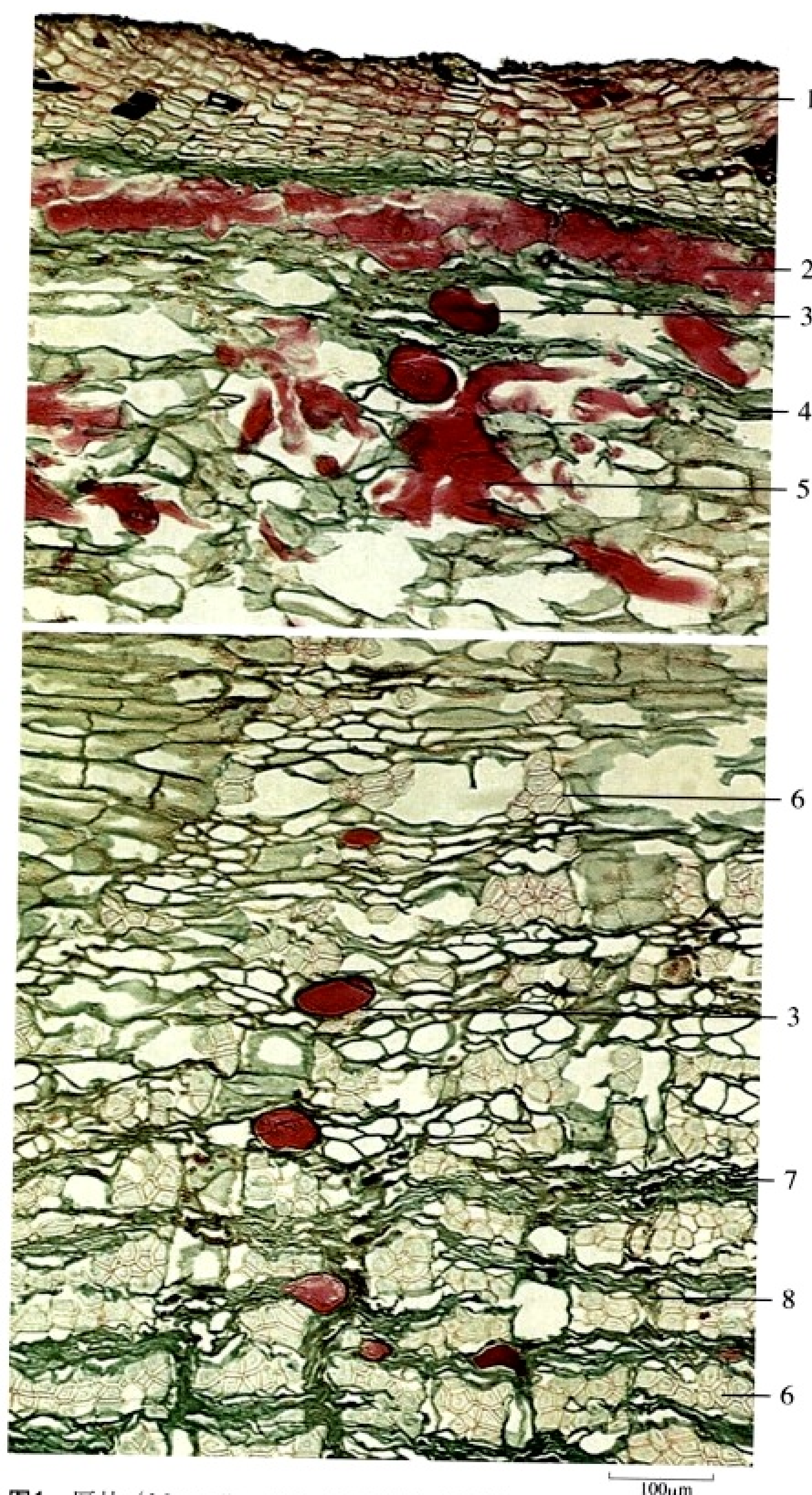


图1　厚朴（*Magnolia officinalis* 干皮）横切面
[Fig1　Transverse section of bark from *Magnolia officinalis*]
1. 木栓层（Cork）　2. 石细胞环带（Ring of stone cells）　3. 油细胞（Oil cells）　4. 皮层（Cortex）　5. 石细胞群（Groups of stone cells）　6. 纤维束（Fibre bundles）　7. 韧皮部（Phloem）　8. 韧皮射线（Phloem rays）

本品为木兰科植物厚朴*Magnolia officinalis* Rehd. et Wils. 或凹叶厚朴*Magnolia officinalis* Rehd. et Wils. var. *biloba* Rehd. et Wils. 的干燥干皮、根皮及枝皮。

[显微特征]　**本品横切面**：木栓层为10余列细胞；有的可见落皮层。皮层外侧有石细胞环带，内侧散有多数油细胞及石细胞群。韧皮部射线宽1～3列细胞；纤维多数个成束；亦有油细胞散在。（图1）

Transverse section: Cork consisting of 10 or more layers of cells, sometimes rhytidome visible. The outer side of cortex showing rings of stone cells and the inner side scattered with numerous oil cells and groups of stone cells. Phloem rays 1 ~ 3 rows of cells; fibres mostly several in bundles; oil cells scattered.（Fig 1）

本品粉末：棕色。纤维甚多，直径15～32μm，壁甚厚，有的呈波浪形或一边呈锯齿状，木化，孔沟不明显。石细胞类方形、椭圆形、卵圆形或不规则分枝状，直径11～65μm，有时可见层纹。油细胞椭圆形或类圆形，直径50～85μm，含黄棕色油状物。（图2）

Powder: Brown. Fibres numerous, 15～32 μm in diameter, walls strongly thickened, sometimes undulate or serrate at one side, lignified, pit canals indistinct. Stone cells subsquare, elliptical, ovate or irregularly branched, 11～65 μm in diameter, sometimes striations visible. Oil cells elliptical or subrounded, 50～85 μm in diameter, containing yellowish-brown oily contents. （Fig 2）



图2 厚朴（*Magnolia officinalis* 干皮）粉末

[Fig2 Powder of stem bark from *Magnolia officinalis*]

1. 纤维（Fibres） 2. 石细胞（Stone cells） 3. 油细胞（Oil cells）

厚 朴 花

Houpohua

FLOS MAGNOLIAE OFFICINALIS

本品为木兰科植物厚朴*Magnolia officinalis* Rehd. et Wils. 或凹叶厚朴*Magnolia officinalis* Rehd.et Wils. var. *biloba* Rehd. et Wils. 的干燥花蕾。

[显微特征] **本品粉末**：红棕色。花被表皮细胞多角形或椭圆形，表面有密集的疣状突起，有的具细条状纹理。石细胞众多，呈不规则分枝状，壁厚7～13μm，孔沟明显，胞腔大。油细胞类圆形或椭圆形，直径37～85μm，壁稍厚，内含黄棕色物。花粉粒椭圆形，长径48～68μm，短径37～48μm，具一远极沟，表面有细网状雕纹。非腺毛1～3细胞，长820～2300μm，壁极厚，有的表面具螺状角质纹理，单细胞者先端长尖，基部稍膨大，多细胞者基部细胞较短或明显膨大，壁薄。（图1）

Powder: Reddish-brown. Epidermal cells of perianth polygonal or elliptical, surface densely warty and some finely striated. Stone cells numerous, irregularly branched, walls 7 ~ 13 μm thick, with distinctly pitted canals and large lumina. Oil cells subrounded or elliptical, 37 ~ 85 μm in diameter, slightly thick-walled, containing yellowish-brown contents. Pollen grains elliptical, 48 ~ 68 μm in long diameter, 37 ~ 48 μm in short diameter, anasulcate, exine with fine reticulate sculptures. Non-glandular hairs consisting of 1 ~ 3 cells, 820 ~ 2300 μm long, the walls heavily thickened, sometimes surface showing spiral cuticular striations. Unicellular hairs acuminate at the apex, slightly inflated at the base; the basal cells of multicellular hairs relatively short or obviously inflated, thin-walled. (Fig 1)



图1 厚朴花（*Magnolia officinalis* 花蕾）粉末

[Fig1 Powder of the flower buds of *Magnolia officinalis*]

1. 花被表皮细胞[Epidermal cells of perianth （a. 表面观Surface view b. 断面观Section view）] 2. 石细胞（Stone cells） 3. 油细胞（Oil cells） 4. 花粉粒（Pollen grains） 5. 单细胞非腺毛（Unicellular non-glandular hairs） 6. 多细胞非腺毛（Multicellular non-glandular hairs）

砂　　仁

Sharen

FRUCTUS AMOMI

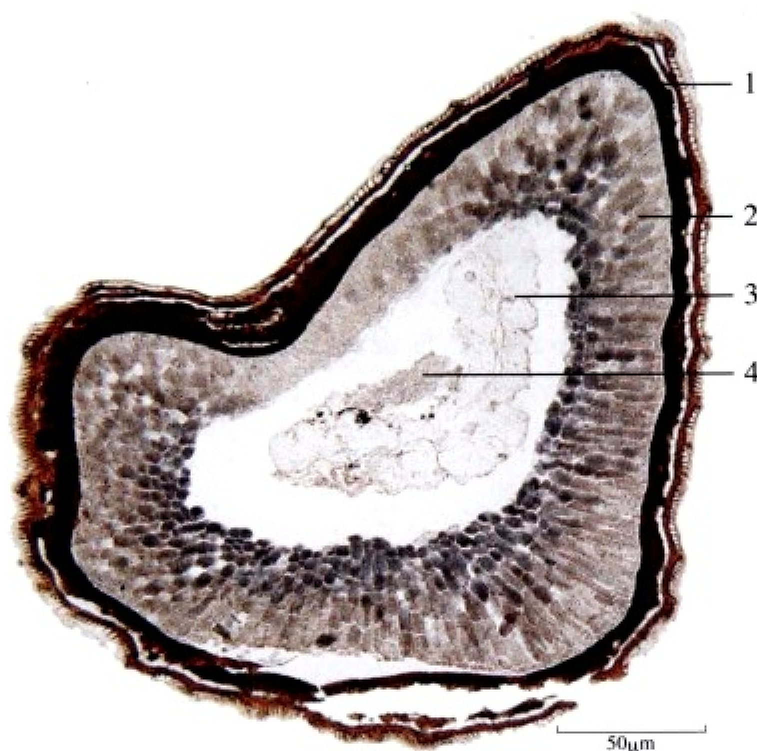


图1　砂仁（*Amomum villosum* 种子）横切面

[Fig1　Transverse section of seed from Amomum villosum]

1. 种皮（Testa）　2. 外胚乳（Perisperm）　3. 内胚乳（Endosperm）　4. 胚（Embryo）

本品为姜科植物阳春砂*Amomum villosum* Lour.、绿壳砂*Amomum villosum* Lour. var. *xanthioides* T. L. Wu et Senjen或海南砂*Amomum longiligulare* T. L. Wu的干燥果实。

[显微特征]　**阳春砂种子横切面：**假种皮有时残存。种皮表皮细胞1列，径向延长，壁稍厚；下皮细胞1列，含棕色或红棕色物。油细胞层为1列油细胞，长76～106μm，宽16～25μm，含黄色油滴。色素层为数列棕色细胞，细胞多角形，排列不规则。内种皮为1列栅状厚壁细胞，黄棕色，内壁及侧壁极厚，细胞小，内含硅质块。外胚乳细胞含淀粉粒，并有少数细小草酸钙方晶。内胚乳细胞含细小糊粉粒及脂肪油滴。（图1、2）

Transverse section of seed of *Amomum villosum:* Remains of aril sometimes visible. Epidermal cells of testa 1 layer, radially elongated, slightly thick-walled; hypodermal cells 1 layer, containing brown or reddish-brown contents. Oil cells in 1 layer, 76～106 μm long, 16～25 μm wide, containing yellow oil droplets. Pigment layer consisting of several layers of brown cells, polygonal, and irregularly arranged. Endotesta consisting of 1 layer of palisade-like thick-walled cells, yellowish-brown, small, with heavily thickened inner and lateral walls, containing silica bodies. Cells of perisperm containing starch granules and a few fine prisms of calcium oxalate. Cells of endosperm containing small aleurone grains and fatty oil droplets.（Fig 1, 2）

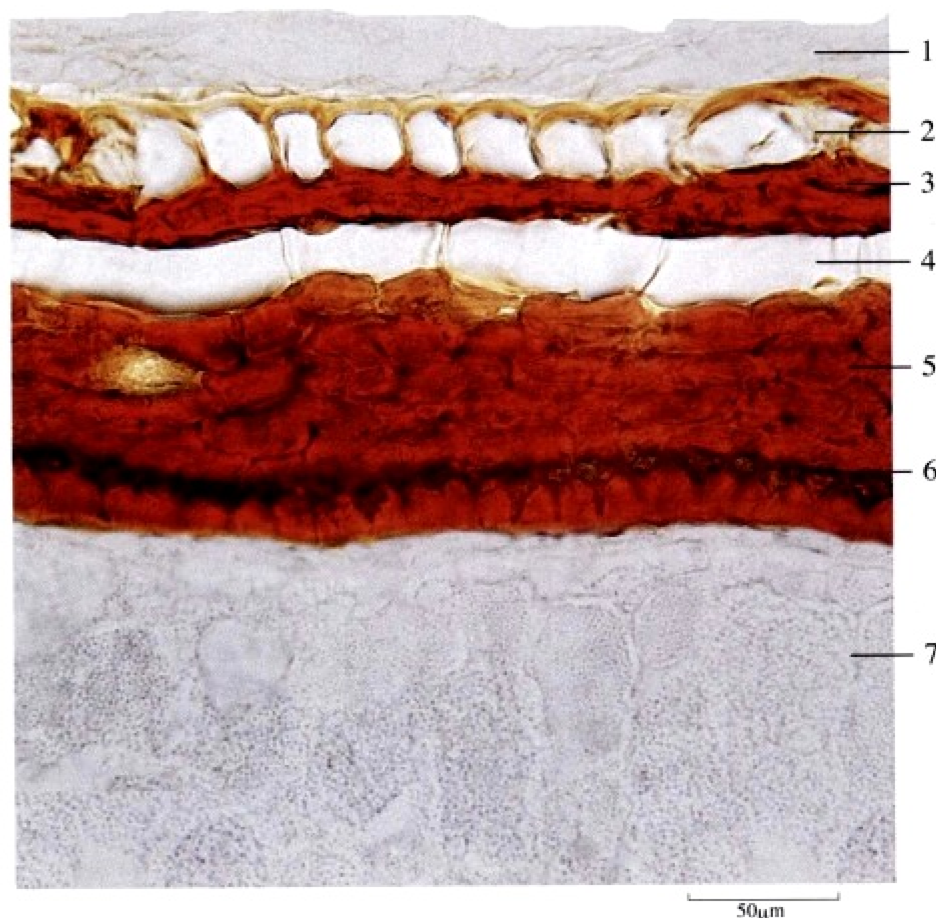


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 假种皮（Aril）　2. 种皮表皮细胞（Epidermal cells of testa）　3.下皮细胞（Hypodermal cells）　4.油细胞（Oil cells）　5. 色素层（Pigment layer）　6.内种皮栅状厚壁细胞（Palisade sclerenchymatous cells of endotesta）　7. 外胚乳细胞（Perisperm cells）

本品粉末：灰棕色。内种皮厚壁细胞红棕色或黄棕色，表面观多角形，壁厚，非木化，胞腔内含硅质块；断面观1列栅状细胞，内壁及侧壁极厚，胞腔偏外侧，内含硅质块。种皮表皮细胞淡黄色，表面观长条形，常与下皮细胞上下层垂直排列；下皮细胞含棕色或红棕色物。色素层细胞皱缩，界限不清楚，含红棕色或深棕色物。外胚乳细胞类长方形或不规则形，充满细小淀粉粒集结成的淀粉团，有的包埋有细小草酸钙方晶。内胚乳细胞含细小糊粉粒及脂肪油滴。油细胞无色，壁薄，偶见油滴散在。（图3）

Powder: Greyish-brown. Thick-walled cells of endotesta reddish-brown or yellow-brown, polygonal in surface view, with thickened and non-lignified walls, lumina containing silica bodies; showing 1 layer of palisade cells in section view with heavily thickened inner and lateral walls, lumina towards to the outer side and containing silica bodies. Epidermal cells of testa pale yellow, stripe-shaped in surface view, usually vertically arranged with hypodermal cells in an upper and lower layered pattern; hypodermal cells containing brown or reddish-brown contents. Cells of pigment layer shrivelled with indistinct boarder, containing reddish-brown or dark brown contents. Cells of perisperm subrectangular or irregular, filled with starch masses formed by aggregation of small starch granules, some containing small prisms of calcium oxalate. Cells of endosperm containing minute aleurone grains and fatty oil droplets. Oil cells colourless, thin-walled and scattered with oil droplets occasionally. （Fig 3）



图3 砂仁（*Amomum villosum* 种子）粉末
[Fig3 Powder of seed from *Amomum villosum*]
1. 内种皮厚壁细胞[Sclerenchymatous cells of endotesta（a. 表面观Surface view b. 断面观Section view）] 2. 种皮表皮细胞（Epidermal cells of testa） 3. 下皮细胞（Hypodermal cells） 4. 色素层细胞（Pigment layer cells） 5. 外胚乳细胞（Perisperm cells） 6. 内胚乳细胞（Endosperm cells） 7. 油细胞（Oil cells）

牵 牛 子

Qianniuzi

SEMEN PHARBITIDIS

本品为旋花科植物裂叶牵牛*Pharbitis nil*（L.）Choisy 或圆叶牵牛*Pharbitis purpurea*（L.）Voigt 的干燥成熟种子。

[显微特征]　本品粉末：淡黄棕色。种皮表皮细胞深棕色，形状不规则，壁波状。非腺毛单细胞，黄棕色，稍弯曲，长50～240μm。子叶碎片中有分泌腔，圆形或椭圆形，直径35～106μm。草酸钙簇晶直径10～25μm。栅状组织碎片及光辉带有时可见。（图1）

Powder: Pale yellowish-brown. Epidermal cells of testa dark brown, irregular in shape, with slightly sinuous walls. Non-glandular hairs unicellular, yellowish-brown, slightly curved, 50～240 μm long. Secretory cavities visible in cotyledon fragments, rounded or elliptical, 35～106 μm in diameter. Clusters of calcium oxalate 10～25 μm in diameter. Fragments of palisade cells of testa and light band visible occasionally.（Fig 1）



图1　牵牛子（*Pharbitis nil*　种子）粉末

[Fig1　Powder of seed from *Pharbitis nil*]

1. 种皮表皮细胞（Epidermal cells of testa）　2. 下皮细胞（Hypodermal cells）　3. 非腺毛（Non-glandular hairs）
4. 栅状细胞（Palisade cells）　5. 分泌腔（Secretory cavities）　6. 草酸钙簇晶（Clusters of calcium oxalate）

鸦 胆 子

Yadanzi

FRUCTUS BRUCEAE

本品为苦木科植物鸦胆子*Brucea javanica*（L.）Merr.的干燥成熟果实。

[显微鉴别] **本品果皮粉末：**棕褐色。表皮细胞多角形，含棕色物。薄壁细胞多角形，含草酸钙簇晶及方晶，簇晶直径约至30μm。石细胞类圆形或多角形，直径14～38μm。（图1）

种子粉末：黄白色。种皮细胞略呈多角形，稍延长。胚乳和子叶细胞含糊粉粒。（图1）

Powder of pericarp: Brown. Epidermal cells polygonal in surface view, containing brown contents. Parenchymatous cells polygonal, containing clusters and prisms of calcium oxalate, clusters up to 30 μm in diameter. Stone cells subrounded or polygonal, 14～38 μm in diameter. (Fig 1)

Powder of seed: Yellowish-white. The cells of testa polygonal, slightly elongated. The cells of endosperm and cotyledon containing aleurone grains. (Fig 1)

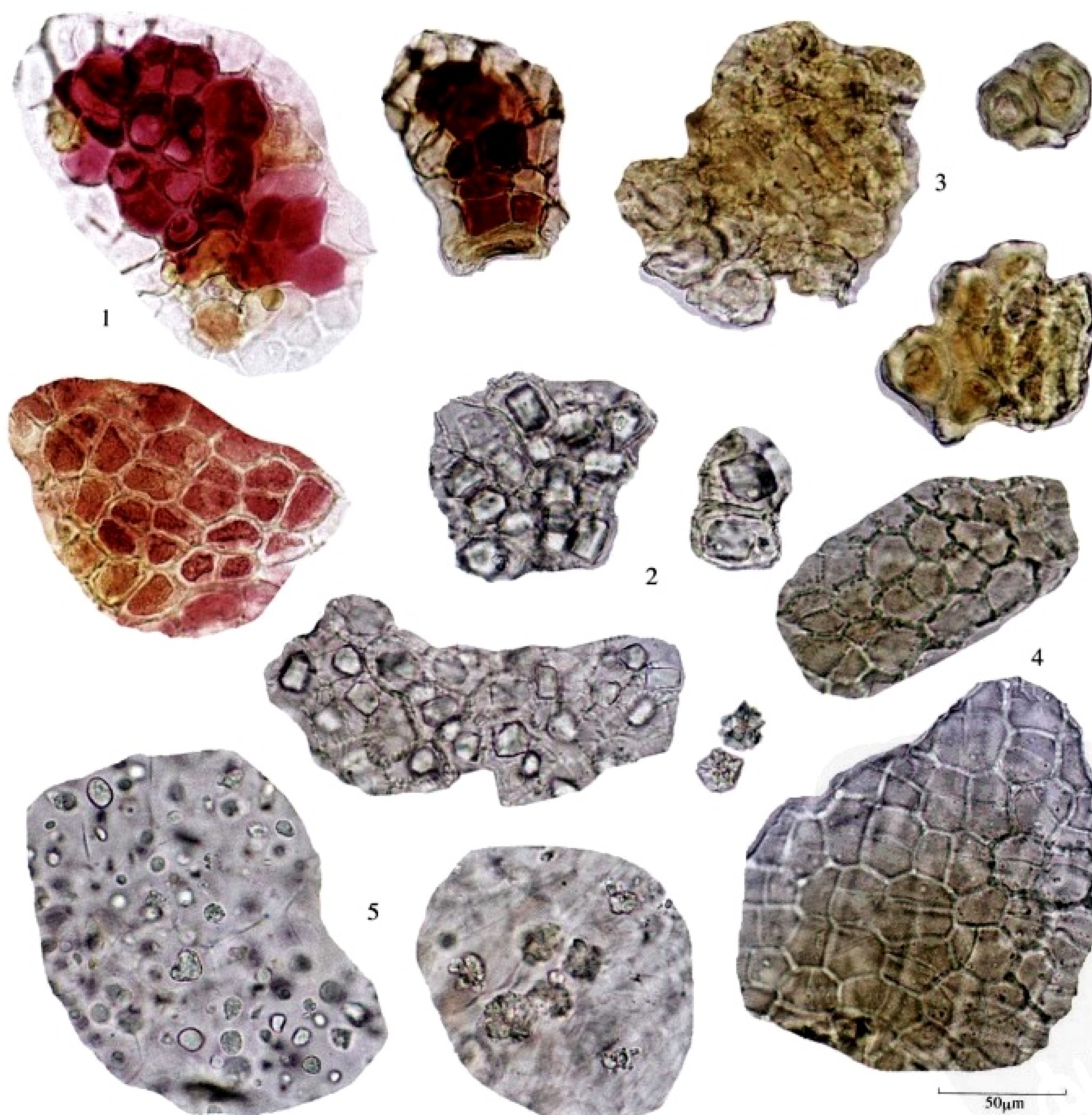


图1 鸦胆子（*Brucea javanica* 果实）粉末

[Fig1 Powder of fruit from *Brucea javanica*]

1. 果皮表皮细胞（Epidermal cells of pericarp） 2. 草酸钙簇晶及方晶（Clusters and prisms of calcium oxalate） 3. 石细胞（Stone cells）
4. 种皮细胞（Cells of testa） 5. 胚乳和子叶细胞（Cells of endosperm and cotyledon）

香 加 皮

Xiangjiapi

CORTEX PERIPLOCAE

本品为萝藦科植物杠柳*Periploca sepium* Bge. 的干燥根皮。

[显微特征] 本品粉末：淡棕色。草酸钙方晶直径9～20μm。石细胞长方形或类多角形，直径24～70μm。乳管含无色油滴状颗粒。木栓细胞棕黄色，多角形。淀粉粒甚多，单粒类圆形或长圆形，直径3～11μm；复粒由2～6分粒组成。（图1）

Powder: Pale brown. Prisms of calcium oxalate 9～20 μm in diameter. Stone cells rectangular or subpolygonal, 24～70 μm in diameter. Laticiferous tubes containing colourless oily granules. Cork cells brownish-yellow. Starch granules numerous, simple granules subrounded or oblong, 3～11 μm in diameter; compound granules of 2～6 components. (Fig 1)

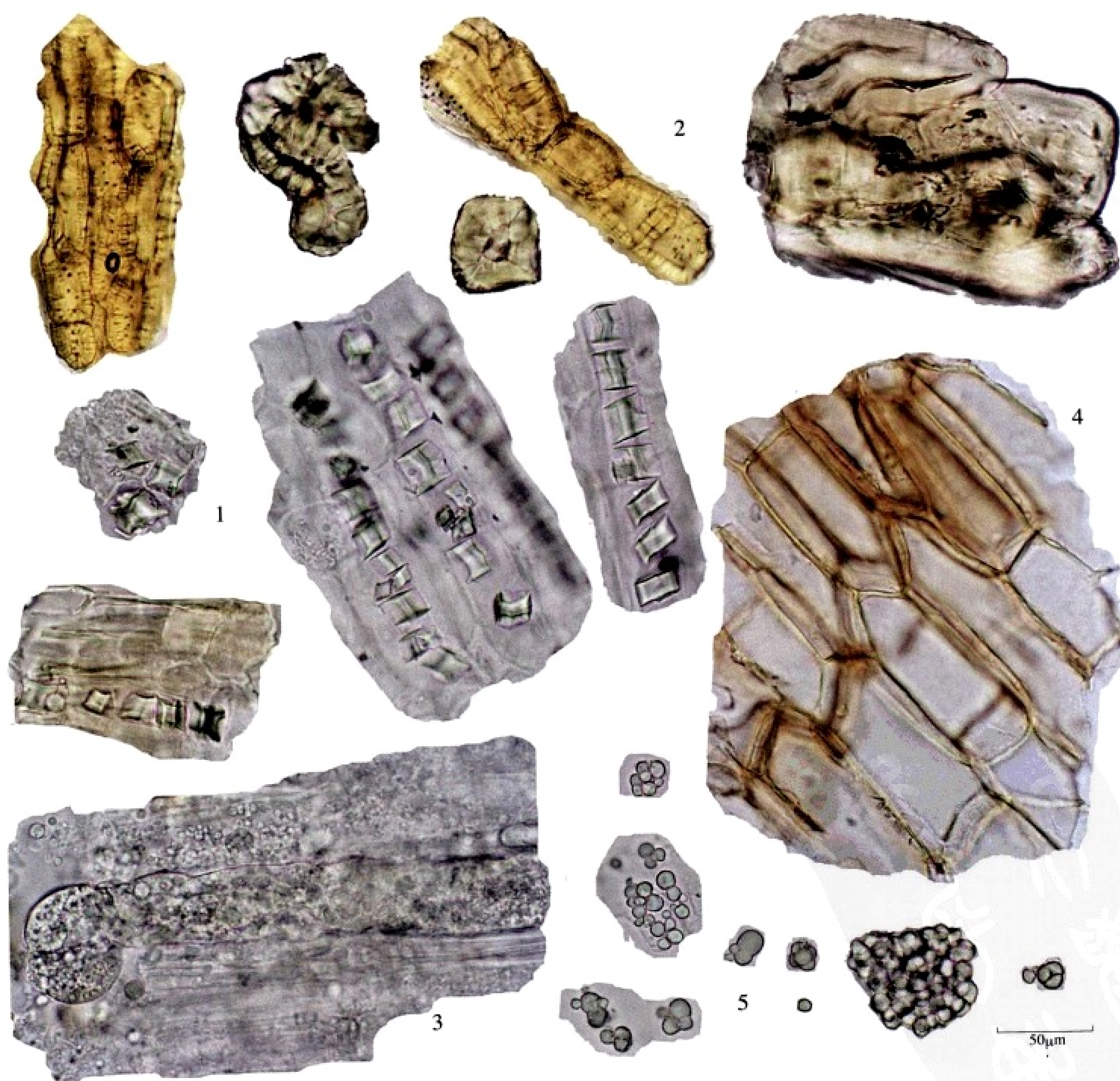


图1 香加皮（*Periploca sepium* 根皮）粉末

[Fig1 Powder of root bark from *Periploca sepium*]

1. 草酸钙方晶（Prisms of calcium oxalate） 2. 石细胞（Stone cells） 3. 乳管（Laticiferous tubes） 4. 木栓细胞（Cork cells） 5. 淀粉粒（Starch granules）

香　　附

Xiangfu

RHIZOMA CYPERI

本品为莎草科植物莎草*Cyperus rotundus* L. 的干燥根茎。

[显微特征]　**本品粉末**：浅棕色。分泌细胞类圆形，直径35～72μm，内含淡黄棕色至红棕色分泌物，其周围5～8个细胞作放射状环列。表皮细胞多角形，常带有下皮纤维及厚壁细胞。下皮纤维成束，深棕色或红棕色，直径7～22μm，壁厚。厚壁细胞类方形、类圆形或形状不规则，壁稍厚，纹孔明显。石细胞少数，类方形、类圆形或类多角形，壁较厚。(图1)

Powder: Pale brown. Secretory cells subrounded, 35 ~ 72 μm in diameter, containing pale yellowish-brown to reddish-brown secretion, 5 ~ 8 adjacent cells radially arranged in a circle. Epidermal cells polygonal, frequently together with hypodermal fibres and sclerenchymatous cells. Hypodermal fibres in bundles, dark brown or reddish-brown, 7 ~ 22 μm in diameter, walls thickened. Sclerenchymatous cells subsquare, subrounded or irregular, walls slightly thickened, pits distinct. Stone cells rare, subsquare, subrounded or subpolygonal, walls relatively thickened.（Fig 1）



图1　香附（*Cyperus rotundus* 根茎）粉末

[Fig1　Powder of rhizome from *Cyperus rotundus*]

1. 分泌细胞（Secretory cells）　2. 表皮细胞（Epidermal cells）　3. 下皮纤维（Hypodermal fibres）　4. 厚壁细胞（Sclerenchymatous cells）　5. 石细胞（Stone cells）

香　　薷

Xiangru

HERBA MOSLAE

本品为唇形科植物石香薷*Mosla chinensis* Maxim. 或江香薷*Mosla chinensis*‘Jiangxiangru’ 的干燥地上部分。前者习称“青香薷”，后者习称“江香薷”。

[显微特征]　本品叶表面观：青香薷　上表皮细胞多角形，垂周壁波状弯曲，略增厚；下表皮细胞壁不增厚，气孔直轴式，以下表皮为多。腺鳞头部8细胞，直径约36～80μm，柄单细胞。上下表皮具非腺毛，多碎断，完整者1～6细胞，上部细胞多弯曲呈钩状，疣状突起较明显。小腺毛少见，头部圆形或长圆形，1～2细胞，柄甚短1～2细胞。（图1）

Surface view of leaf：Qingxiangru　Upper epidermal cells polygonal, anticlinal walls sinuous and slightly thickened; lower epidermal cells not thickened; stomata diacytic, more frequently observed on the lower surface. Glandular scales with 8-celled heads , 36～80 μm in diameter and unicellular stalks. Non-glandular hairs on the upper and lower epidermis mostly broken, 1～6 celled when whole, the upper cells frequently hook-like, warty protrudings distinct. Small glandular hairs occasionally visible, heads rounded or long rounded, with 1～2 cells, stalk short, with 1～2 cells.（Fig 1）

江香薷　上表皮腺鳞直径约90μm，柄单细胞，非腺毛多由2～3个细胞组成，下部细胞长于上部细胞，疣状突起不明显，非腺毛基足细胞5～6个，垂周壁连珠状增厚。

Jiangxiangru　Glandular scales on the upper epidermis 90 μm in diameter，unicellular stalks; non-glandular hairs 2～3 celled, the lower cells longer than the upper cells, warty protrudings indistinct, basal cells of non-glandular hairs 5～6, with beaded thickened anticlinal walls.



图1　香薷（*Mosla chinensis* 叶）粉末

[Fig1　Powder of leaf from *Mosla chinensis*]

1. 上表皮细胞（Upper epidermal cells）　2. 下表皮细胞（Lower epidermal cells）　3. 腺鳞（Glandular scales）　4. 非腺毛（Non-glandular hairs）　5. 小腺毛（Small glandular hairs）

重　　楼

Chonglou

RHIZOMA PARIDIS

本品为百合科植物云南重楼*Paris polyphylla* Smith var. *yunnanensis*（Franch.）Hand. -Mazz. 或七叶一枝花*Paris polyphylla* Smith var. *chinensis*（Franch.）Hand. 的干燥根茎。

[显微特征]　本品粉末：白色。淀粉粒甚多，类圆形、长椭圆形或肾形，直径3～18μm。草酸钙针晶成束或散在，长80～250μm。梯纹及网纹导管直径10～25μm。（图1）

Powder: White. Starch granules numerous, subrounded, long elliptic or reniform, 3～18 μm in diameter. Needle crystals of calcium oxalate bundled or scattered, 80～250 μm long. Scalariform and reticulated vessels 10～25 μm in diameter.（Fig 1）

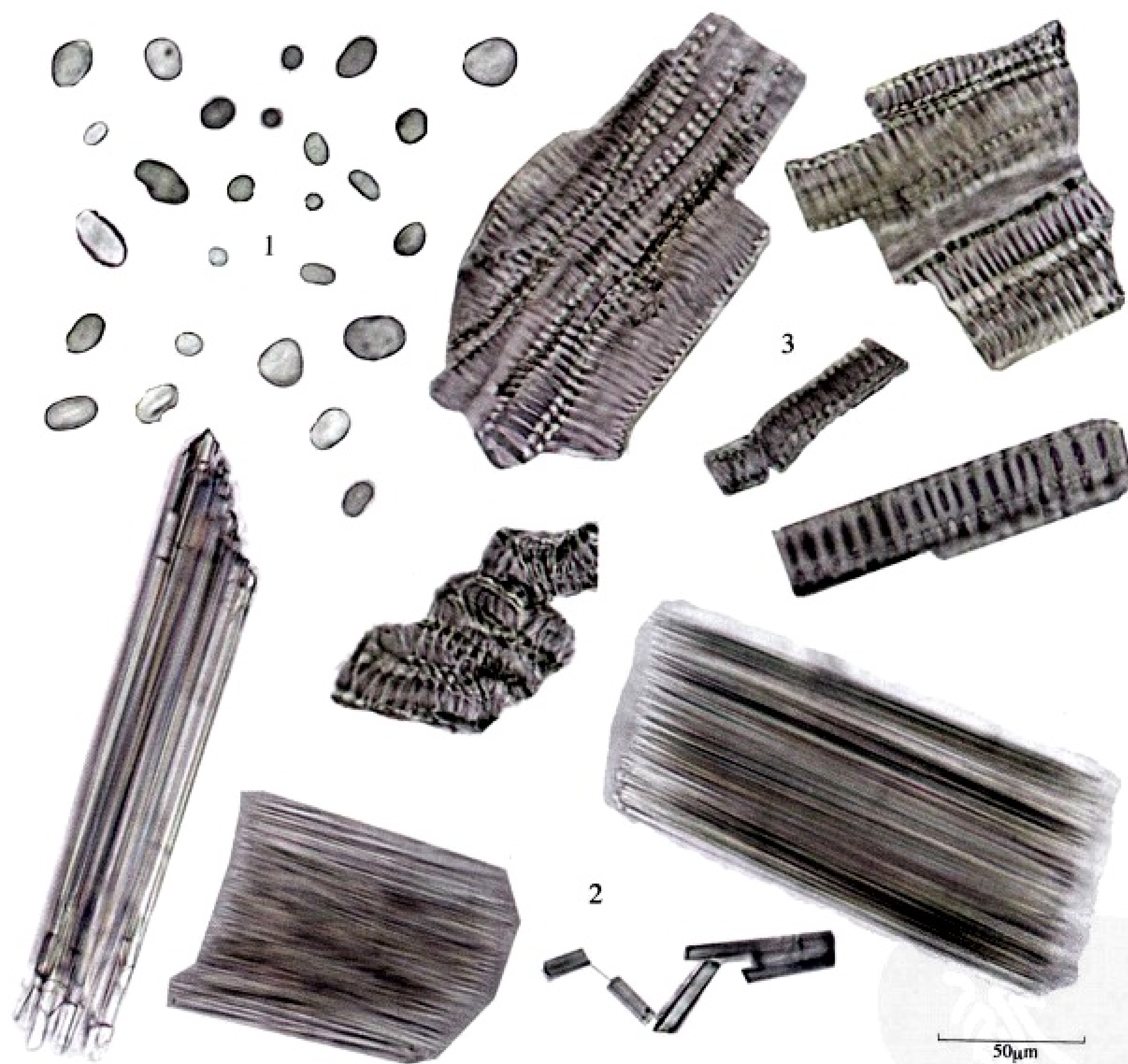


图1　重楼（*Paris polyphylla* var. *yunnanensis* 根茎）粉末

[Fig1　Powder of rhizome from *Paris polyphylla* var. *yunnanensis*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶（Needle crystals of calcium oxalate）　3. 导管（Vessels）

禹州漏芦

Yuzhou Loulu

RADIX ECHINOPSIS

本品为菊科植物蓝刺头*Echinops latifolius* Tausch 或华东蓝刺头*Echinops grijisii* Hance 的干燥根。

［显微特征］ 本品粉末：棕黄色。韧皮纤维多成束，直径20～42μm，壁厚，细胞间隙有棕褐色树脂状物。木纤维细长，两端渐尖，直径12～30μm，壁较厚。具缘纹孔及网纹导管较多见，直径20～120μm。石细胞少见，类圆形、长方形或方形，直径35～150μm，层纹及孔沟明显，细胞间隙有棕褐色树脂状物。分泌管长条形，直径26～60μm，内含红棕色分泌物。（图1）

Powder: Brownish-yellow. Phloem fibres in bundles, 20 ~ 42 μm in diameter, with thickened walls, the intercellular spaces of cells containing brown resinous substances. Xylem fibres slender, acuminate towards two ends, 12 ~ 30 μm in diameter, walls relatively thickened. Bordered pitted vessels and reticulated vessels more frequent, 20 ~ 120 μm in diameter. Stone cells less frequent, subrounded, rectangular or square, 35 ~ 150 μm in diameter, with distinct striations and pit canals, the intercellular spaces of stone cells containing brown resinous substances. Secretory tubes sliver-shaped, 26 ~ 60 μm in diameter, containing reddish- brown secretions. (Fig 1)



图1 禹州漏芦（*Echinops latifolius* 根）粉末

[Fig1 Powder of root from *Echinops latifolius*]

1. 韧皮纤维（Phloem fibres） 2. 木纤维（Xylem fibres） 3. 导管（Vessels） 4. 石细胞（Stone cells） 5. 分泌管（Secretory tubes）

胆　南　星

Dannanxing

ARISAEMA CUM BILE

本品为制天南星的细粉与牛、羊或猪胆汁经加工而成，或为生天南星的细粉与牛、羊或猪胆汁经发酵加工而成。

［显微特征］　本品粉末：淡黄棕色。薄壁细胞类圆形，充满糊化淀粉粒。草酸钙针晶束长20～90μm。螺纹及环纹导管直径8～60μm。（图1）

Powder: Pale yellowish-brown. Parenchymatous cells subrounded, filled with gelatinized starch granules. Raphides of calcium oxalate 20～90 μm long. Spiral and annular vessels 8～60 μm in diameter. (Fig 1)



图1　胆南星粉末

[Fig1　Powder of the Bile Arisaema]

1. 薄壁细胞含糊化淀粉粒（Parenchymatous cells containing gelatinized starch granules）　2. 淀粉粒（Starch granules）
3. 草酸钙针晶束（Raphides of calcium oxalate）　4. 导管（Vessels）

注：样品可见未糊化淀粉粒，在偏光显微镜下淀粉粒具偏光现象，加碘试液显蓝紫色。

Note: Ungelatinized starch granules visible and with polarization under polarizing microscope, showing bluish-purple when meeting iodine TS.

独　一　味

Duyiwei

HERBA LAMIOPHLOMIS

本品系藏族习用药材。为唇形科植物独一味 *Lamiophlomis rotata*（Benth.）Kudo 的干燥全草。

[显微特征]　本品粉末：棕褐色。非腺毛众多，2～3个细胞组成，直径10～15μm，壁较厚，有疣状突起。叶肉细胞呈不规则形，内含众多草酸钙针晶，长7～10μm。气孔直轴式或不等式。纤维长梭形，壁孔横裂。（图1）

Powder: Dark brown. Non-glandular hairs numerous, 2 ~ 3 celled, 10 ~ 15 μm in diameter, walls relatively thickened, with warty prominences. Mesophyll cells irregular, containing numerous needle crystals of calcium oxalate, 7 ~ 10 μm long. Stomata diacytic or anisocytic. Fibres long spindle-shaped, pit canals transversely lobed.（Fig 1）



图1　独一味（*Lamiophlomis rotata* 全草）粉末

[Fig1　Powder of herb from *Lamiophlomis rotata*]

1. 非腺毛（Non-glandular hairs）　2. 叶肉细胞（Mesophyll cells）　3. 叶表皮细胞及气孔（Epidermal cells and stomata of leaf）　4. 纤维（Fibres）

独　活

Duhuo

RADIX ANGELICAE PUBESCENTIS

本品为伞形科植物重齿毛当归 *Angelica pubescens* Maxim. f. *biserrata* Shan et Yuan 的干燥根。

[显微特征]　本品横切面：木栓细胞数列。栓内层窄，有少数油室。韧皮部宽广，约占根的1/2；油室较多，排成数轮，切向径约至153μm，周围分泌细胞6～10个。形成层成环。木质部射线较宽，导管稀少，直径约至84μm，常单个径向排列。薄壁细胞含淀粉粒。(图1、2)

Transverse section: Cork consisting of several layers of cells. Phelloderm narrow, with fewer oil cavities. Phloem broad, occupying about 1/2 of the radius of root; oil cavities relatively abundant, arranged in several rings, up to 153 μm tangentially, surrounded by 6～10 secretory cells. Cambium in a ring. Xylem ray relatively wide. Vessels sparse, up to 84 μm in diameter, frequently arranged singly and radially. Parenchymatous cells containing starch granules. (Fig 1, 2)

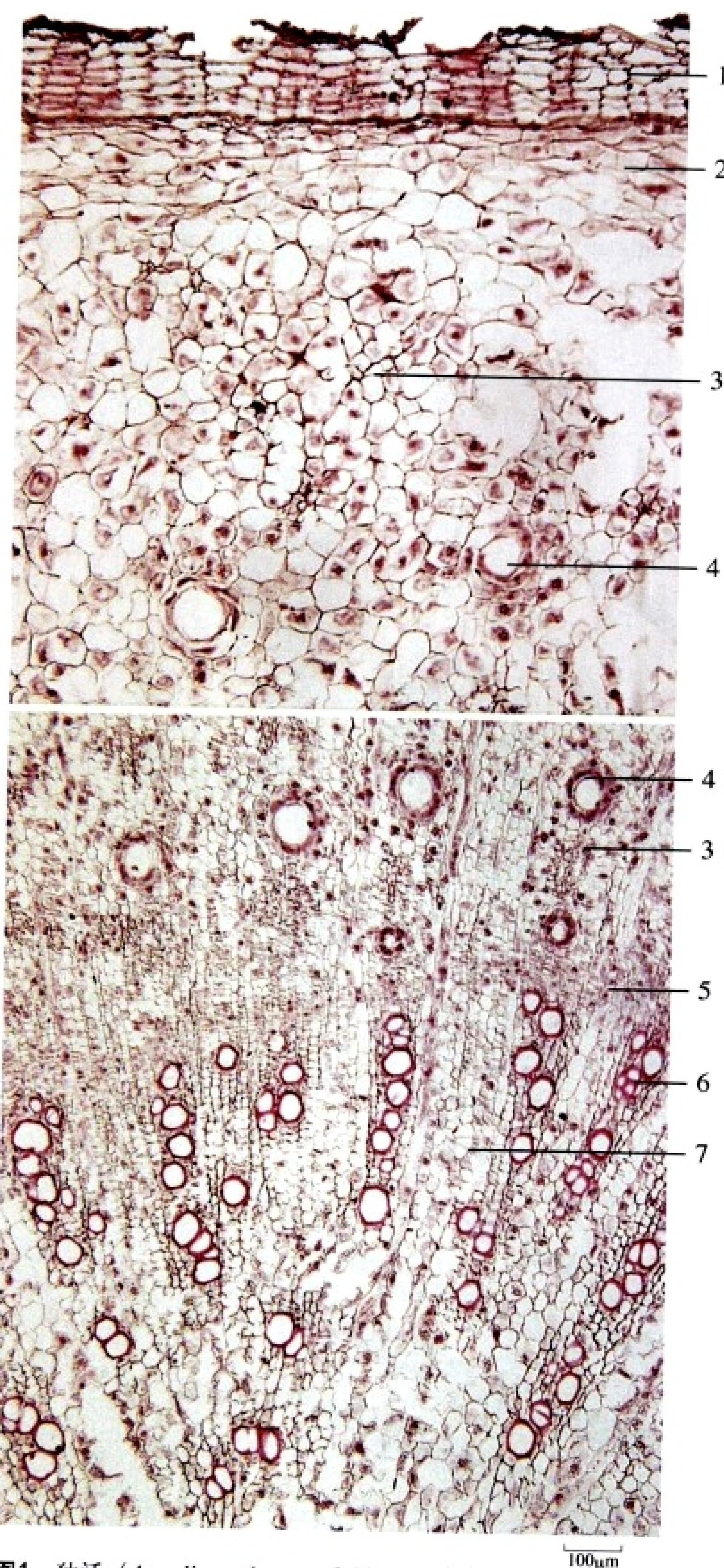


图1　独活（*Angelica pubescens* f. *biserrata* 根）横切面
[Fig1　Transverse section of root from *Angelica pubescens* f. *biserrata*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 韧皮部（Phloem）
4. 油室（Oil cavities）　5. 形成层（Cambium）　6. 木质部（Xylem）
7. 木射线（Xylem rays）

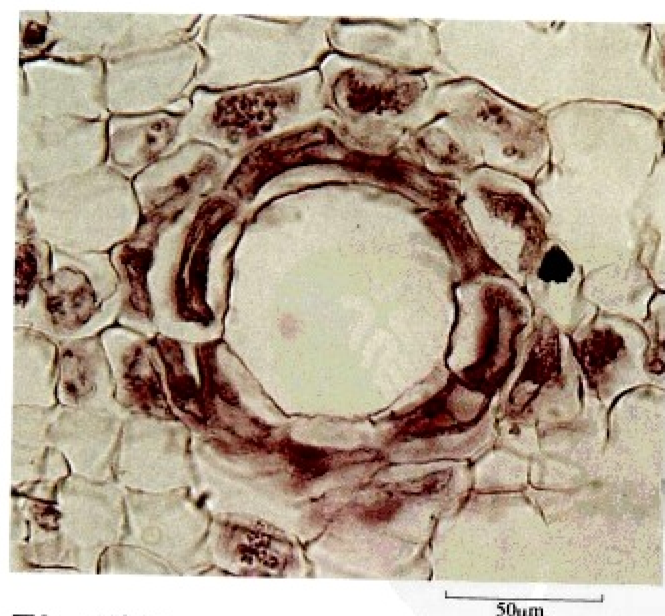
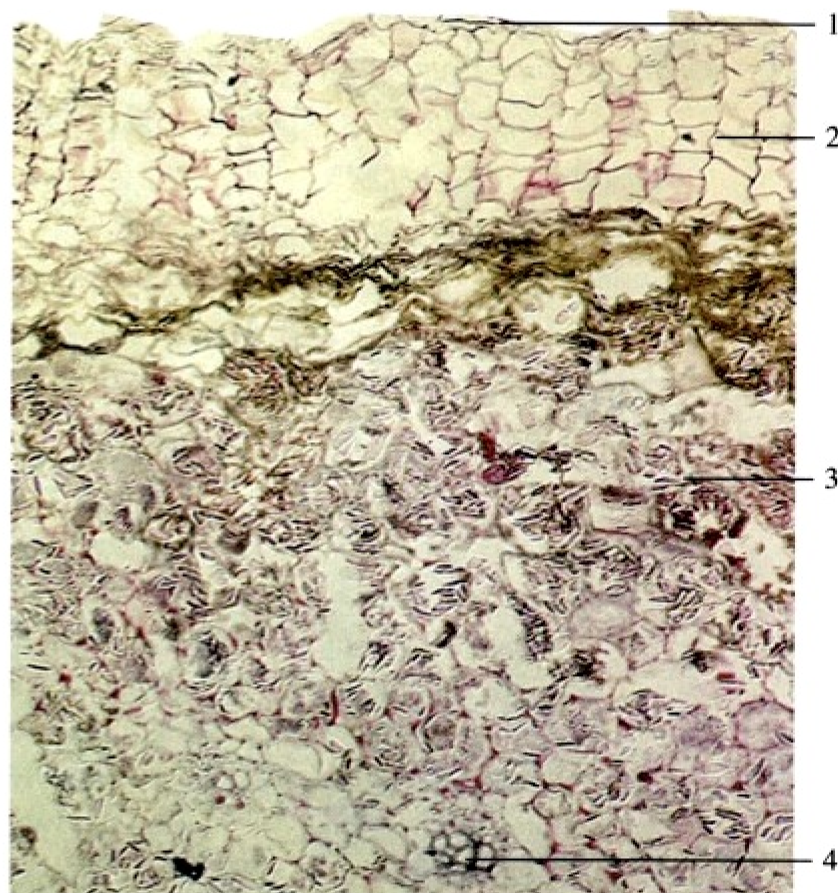


图2　示油室
[Fig2　Showing oil cavity]

姜　黄

Jianghuang

RHIZOMA CURCUMAE LONGAE



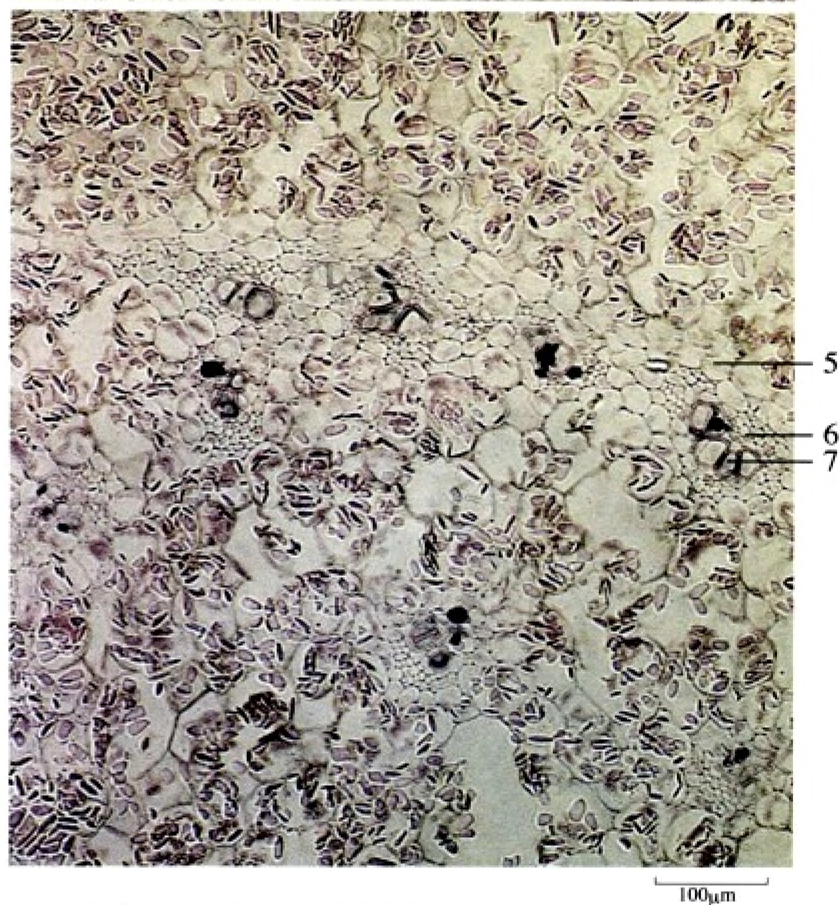


图1　姜黄（*Curcuma longa* 根茎）横切面

[Fig1　Transverse section of rhizome from *Curcuma longa*]

1. 表皮（Epidermis）　2. 木栓层（Cork）　3. 皮层（Cortex）　4. 叶迹维管束（Leaf trace vascular bundles）　5. 内皮层（Endodermis）　6. 韧皮部（Phloem）　7. 木质部（Xylem）

本品为姜科植物姜黄*Curcuma longa* L.的干燥根茎。

[显微特征]　**本品横切面：**表皮细胞扁平，壁薄。皮层宽广，有叶迹维管束；外侧近表皮处有6～8列木栓细胞，扁平；内皮层细胞凯氏点明显。中柱鞘为1～2列薄壁细胞维管束外韧型，散列，近中柱鞘处较多，向内渐减少。薄壁细胞含油滴、淀粉粒及红棕色色素。（图1、2）

Transverse section: Epidermal cells flattened, thin-walled. Cortex broad, scattered with leaf trace bundles, showing 6～8 layers of flattened cork cells at the outside near the epidermis, endodermal cells with distinct Casparian dots. Pericycle consisting of 1～2 rows of parenchymatous cells. Collateral bundles scattered, more present near the pericycle and less inwards. Parenchymatous cells containing droplets of oil, starch granules and reddish-brown pigments. (Fig 1, 2)

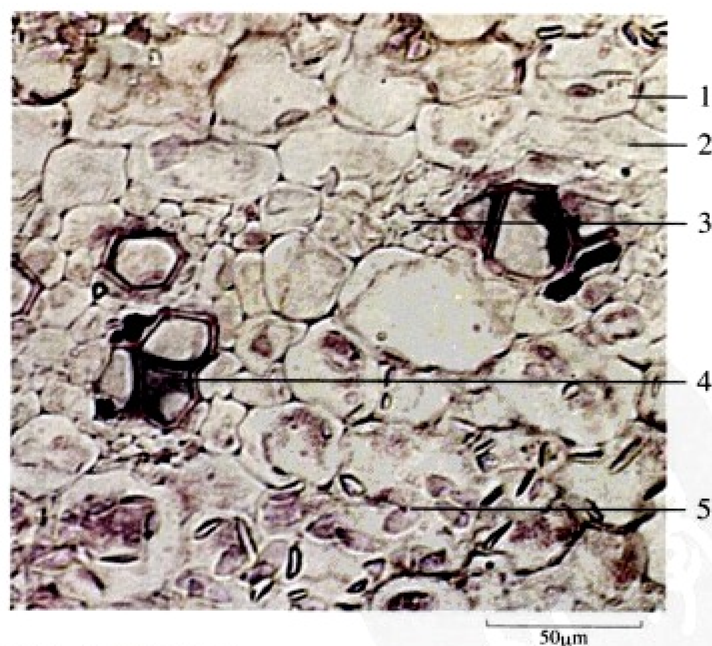


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 内皮层（Endodermis）　2. 中柱鞘（Pericycle）　3. 筛管群（Sieve tube groups）　4. 导管（Vessels）　5. 淀粉粒（Starch granules）

首 乌 藤

Shouwuteng

CAULIS POLYGONI MULTIFLORI

本品为蓼科植物何首乌*Polygonum multiflorum* Thunb. 的干燥藤茎。

[显微特征] **本品横切面**：表皮细胞有时残存。木栓细胞3～4列，含棕色色素。皮层较窄。中柱鞘纤维束断续排列成环，纤维壁甚厚，木化；在纤维束间时有石细胞群。韧皮部较宽。形成层成环。木质部导管类圆形，直径约至204μm，单个散列或数个相聚。髓较小。薄壁细胞含草酸钙簇晶。（图1、2）

Transverse section: Remaining epidermal cells sometimes visible. Cork consisting of 3～4 layers of cells, containing brown pigment. Cortex relatively narrow. Fibre bundles in pericycle arranged in a interrupted ring. Walls of fibres markedly thickened and lignified; groups of stone cells occasionally existing among fibre bundles. Phloem relatively wide. Cambium in a ring. Vessels in xylem subrounded, up to 204 μm in diameter, singly scattered or several aggregated in groups. Pith relatively small. Parenchymatous cells containing clusters of calcium oxalate. (Fig 1, 2)

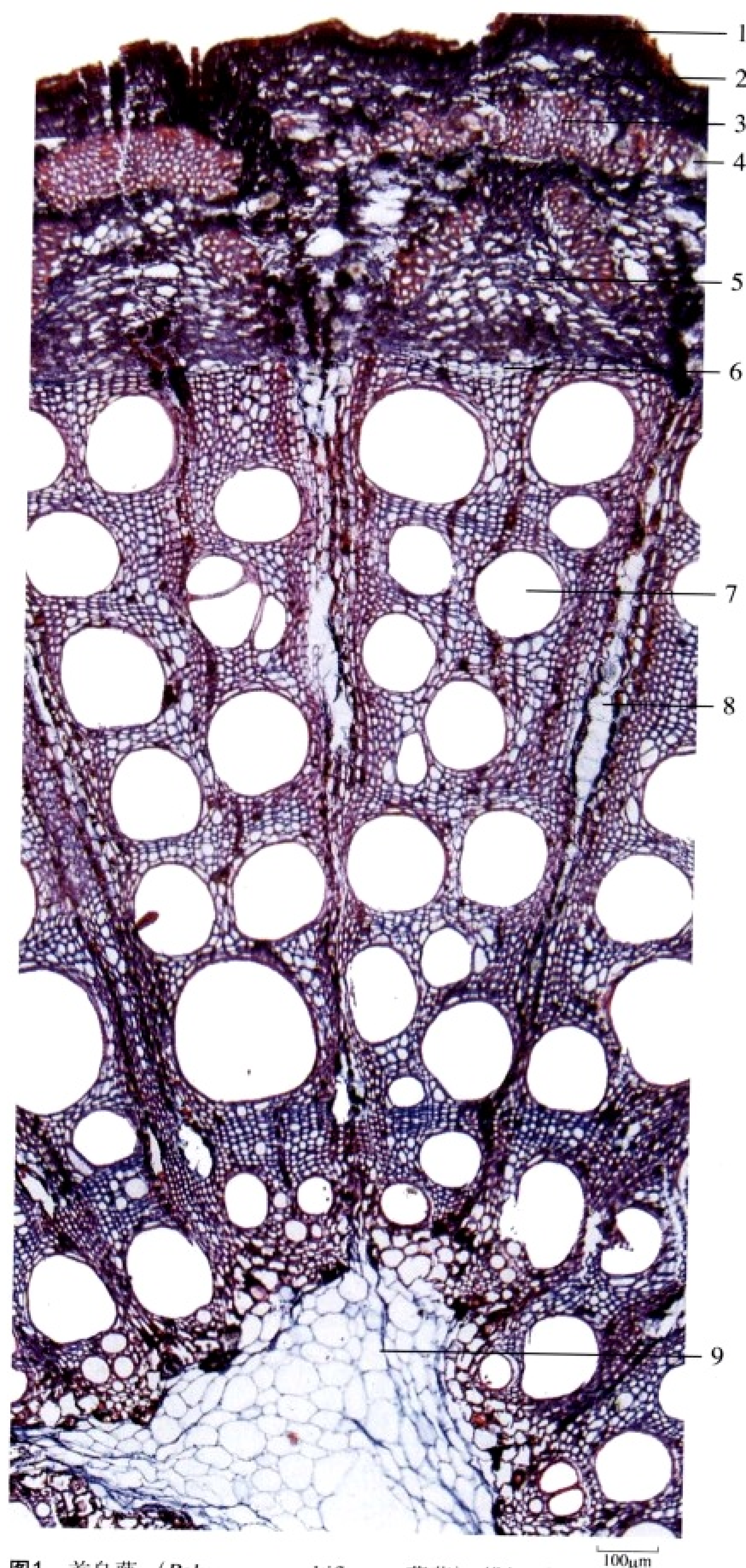


图1 首乌藤（*Polygonum multiflorum* 藤茎）横切面

[Fig1 Transverse section of lianoid stem from *Polygonum multiflorum*]

1. 木栓层（Cork） 2. 皮层（Cortex） 3. 中柱鞘纤维束（Pericyclic fibre bundles） 4. 草酸钙簇晶（Clusters of calcium oxalate） 5. 韧皮部（Phloem） 6. 形成层（Cambium） 7. 木质部（Xylem） 8. 射线（Rays） 9. 髓（Pith）

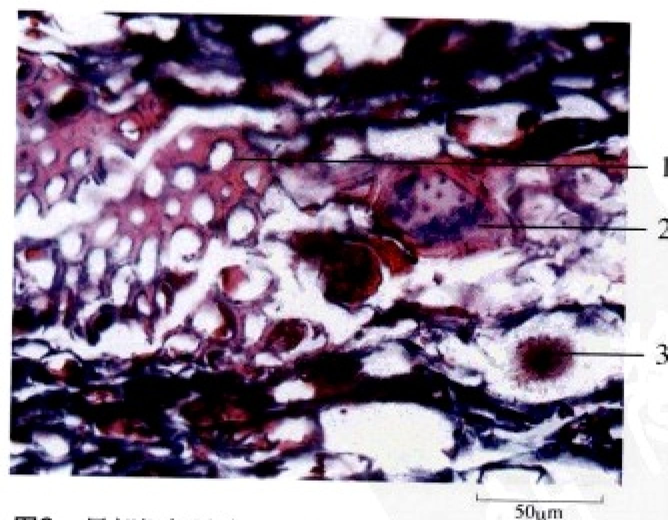


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 中柱鞘纤维束（Pericyclic fibre bundles） 2. 石细胞（Stone cells） 3. 草酸钙簇晶（Clusters of calcium oxalate）

洋 金 花

Yangjinhua

FLOS DATURAE

本品为茄科植物白花曼陀罗*Datura metel* L.的干燥花。

[显微特征]　**本品粉末**：淡黄色。花粉粒类球形或长圆形，直径42～65μm，表面有条纹状雕纹。花萼非腺毛1～3细胞，壁具疣突；腺毛头部1～5细胞，柄1～5细胞。花冠裂片边缘非腺毛1～10细胞，壁微具疣突。花丝基部非腺毛粗大，1～5细胞，基部直径约至128μm，顶端钝圆。花萼、花冠薄壁细胞中有草酸钙砂晶、方晶及簇晶。（图1）

Powder: Pale yellow. Pollen grains subspherical or oblong, 42 ~ 65 μm in diameter, with striated sculptures. Non-glandular hairs of calyx 1 ~ 3 celled, with warts on the walls. Glandular hairs each with a 1 ~ 5 celled head and a 1 ~ 5 celled stalk. Non-glandular hairs on the edge of corolla lobes 1 ~ 10 celled, with slightly warty prominences on the walls. Non-glandular hairs on the base of filament thick, 1 ~ 5 celled, up to 128 μm in diameter at the base, apex obtused. Sands prisms and clusters of calcium oxalate occurring in the parenchymatous cells of corolla and calyx.（Fig 1）



图1　洋金花（*Datura metel* 花）粉末

[Fig1　Powder of flower from *Datura metel*]

1. 花粉粒（Pollen grains）　2. 非腺毛（Non-glandular hairs）　3. 腺毛（Glandular hairs）　4. 草酸钙结晶（Crystals of calcium oxalate）

穿 山 龙

Chuanshanlong

RHIZOMA DIOSCOREAE NIPPONICAE

本品为薯蓣科植物穿龙薯蓣*Dioscorea nipponica* Makino 的干燥根茎。

[显微特征] 本品粉末：淡黄色。淀粉粒单粒椭圆形、类三角形、圆锥形或不规则形，直径3～17μm，长至33μm，脐点长缝状。草酸钙针晶散在，或成束存在于黏液细胞中，长约至110μm。木化薄壁细胞淡黄色或黄色，呈长椭圆形、长方形或菱形，纹孔较小而稀疏。具缘纹孔导管直径17～56μm，纹孔细密，椭圆形。（图1）

Powder: Pale yellow. Starch granules simple, elliptical, subtriangular, conical or irregular, 3～17 μm in diameter, up to 33 μm long, hilum slit-shaped. Needle crystals of calcium oxalate scattered, or in bundles occurring in mucilage cells, up to 110 μm long. Lignified parenchymatous cells pale yellow or yellow, elongated elliptical, rectangular or rhombic, with small and sparse pits. Bordered pitted vessels 17～56 μm in diameter, pits fine and dense, elliptical. (Fig 1)

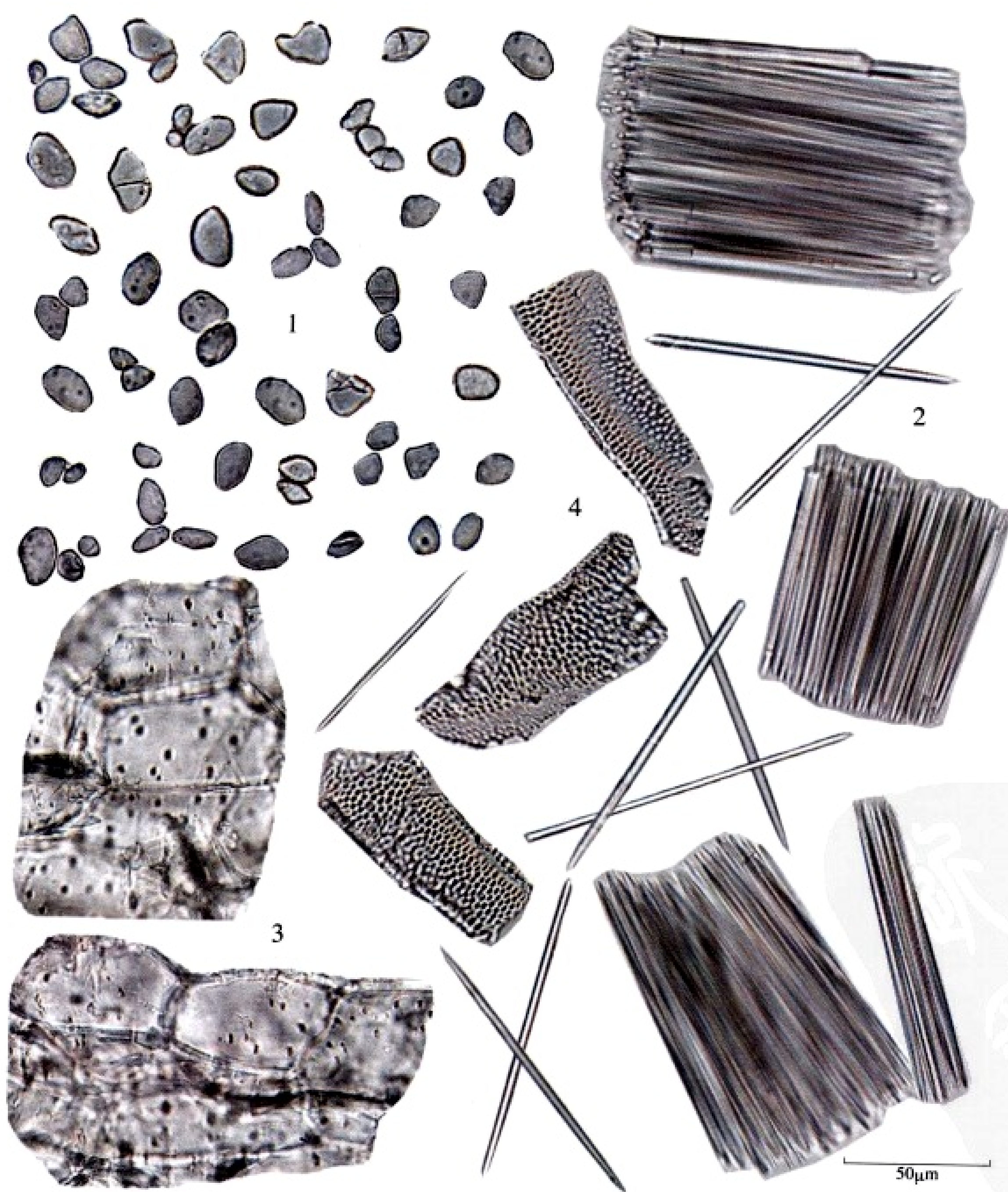


图1 穿山龙（*Dioscorea nipponica* 根茎）粉末

[Fig1 Powder of rhizome from *Dioscorea nipponica*]

1. 淀粉粒（Starch granules） 2. 草酸钙针晶（Needle crystals of calcium oxalate） 3. 木化薄壁细胞（Lignified parenchymatous cells） 4. 导管（Vessels）

穿　心　莲
Chuanxinlian
HERBA ANDROGRAPHIS

本品为爵床科植物穿心莲*Andrographis paniculata*（Burm.f.） Nees 的干燥地上部分。

[显微特征]　**本品叶横切面：**上表皮细胞类方形或长方形，下表皮细胞较小，上、下表皮均有含圆形、长椭圆形或棒状钟乳体的晶细胞，并有腺鳞，有的可见非腺毛。栅栏组织为1～2列细胞，贯穿于主脉上方；海绵组织排列疏松。主脉维管束外韧型，呈凹槽状，木质部上方亦有晶细胞。（图1、2）

Transverse section of leaf: Upper epidermal cells subsquare or rectangular, lower epidermal cells relatively small, both surfaces with crystal cells containing rounded, long-elliptical or clavate cystoliths. Glandular scales and sometimes non-glandular hairs visible. Palisade tissue 1～2 layers of cells, acrossing the upper part of midrib; spongy cells arranged loosely. Vascular bundle of midrib collateral and grooved, crystal cells also occurring over the xylem. （Fig 1,2）

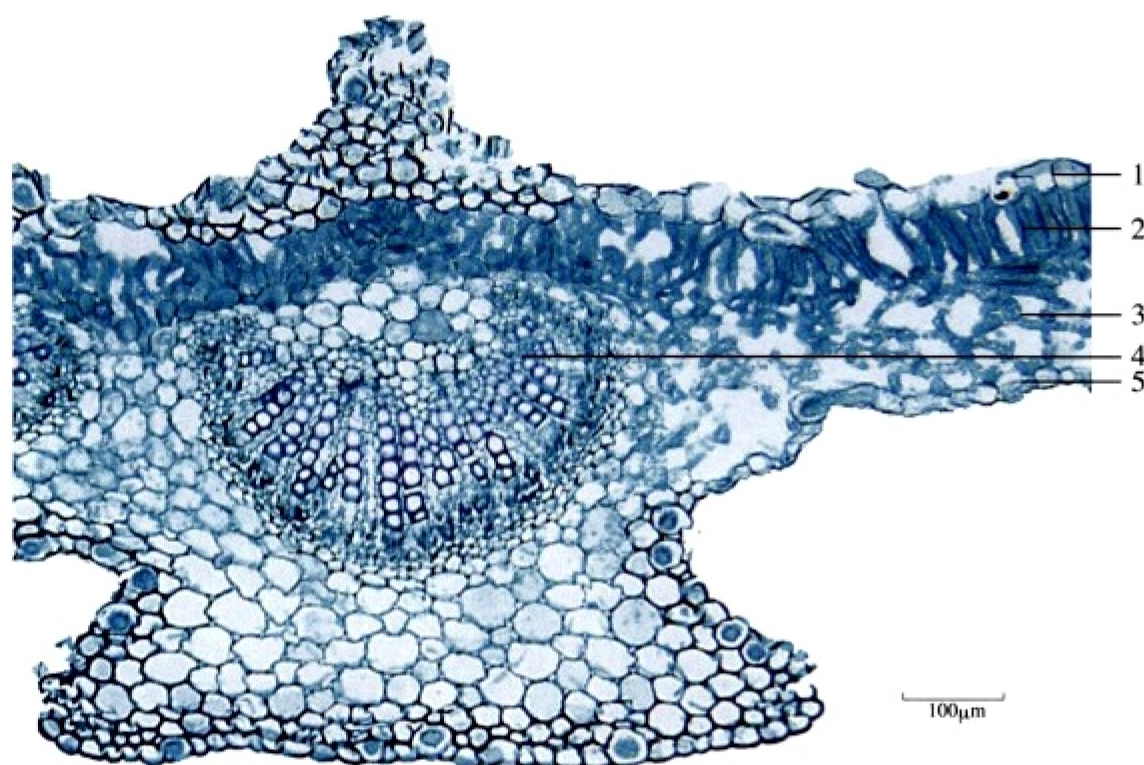


图1　穿心莲（*Andrographis paniculata* 叶）横切面

[Fig1　Transverse section of leaf from *Andrographis paniculata*]

1. 上表皮（Upper epidermis）　2. 栅栏组织（Palisade tissue）　3. 海绵组织（spongy tissue）　4. 主脉维管束（Vascular bundle of midrib）　5. 下表皮（Lower epidermis）

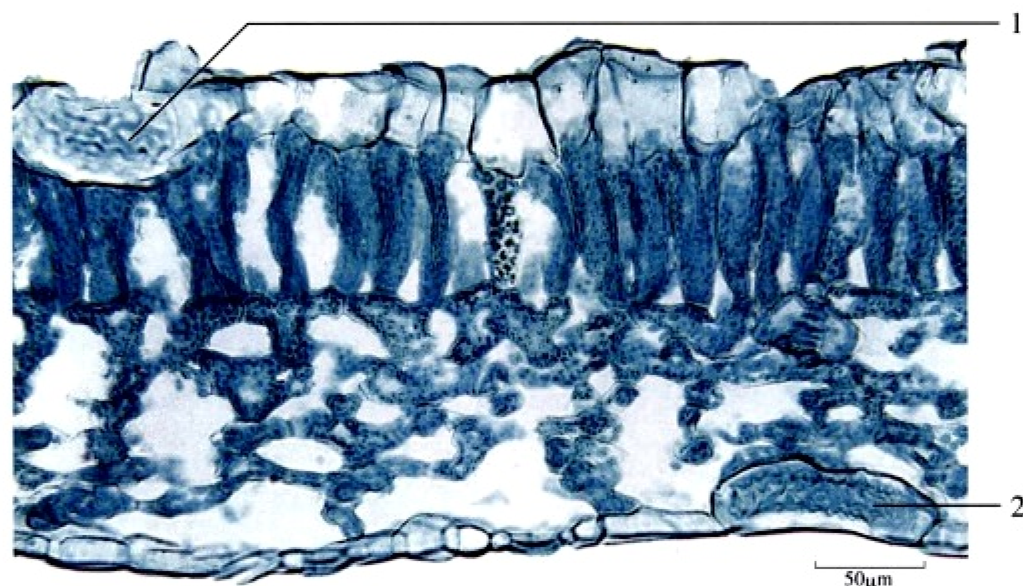


图2　局部组织放大

[Fig2　Partial tissue magnified]

1，2. 上、下表皮含晶细胞（Upper and lower epidermis with crystal cells）

本品叶表面观：上下表皮均有增大的晶细胞，内含大型螺状钟乳体，直径约至36μm，长约至180μm，较大端有脐样点痕，层纹波状。下表皮气孔密布，直轴式，副卫细胞大小悬殊，也有不定式。腺鳞头部扁球形，4、6（8）细胞，直径至40μm，柄极短。非腺毛1～4细胞，长约至160μm，基部直径约至40μm，表面有角质纹理。(图3)

Surface view of leaf: Enlarged crystal cells occurring in the upper and lower epidermis, containing large conchoidal cystoliths, up to 36 μm in diameter and 180 μm long, with hilum-shaped scars in the large ends, and wavy striations. Stomata more frequent on the lower epidermis, diacytic, sometimes anomocytic, subsidiary cells significantly varying in size. Heads of glandular scales oblate, 4,6（8）-celled, up to 40 μm in diameter, stalks very short. Non-glandular hairs 1～4 celled, up to 160 μm long and 40 μm in diameter, with cuticular striations on surface.（Fig 3）



图3 穿心莲（*Andrographis paniculata* 叶）表面观

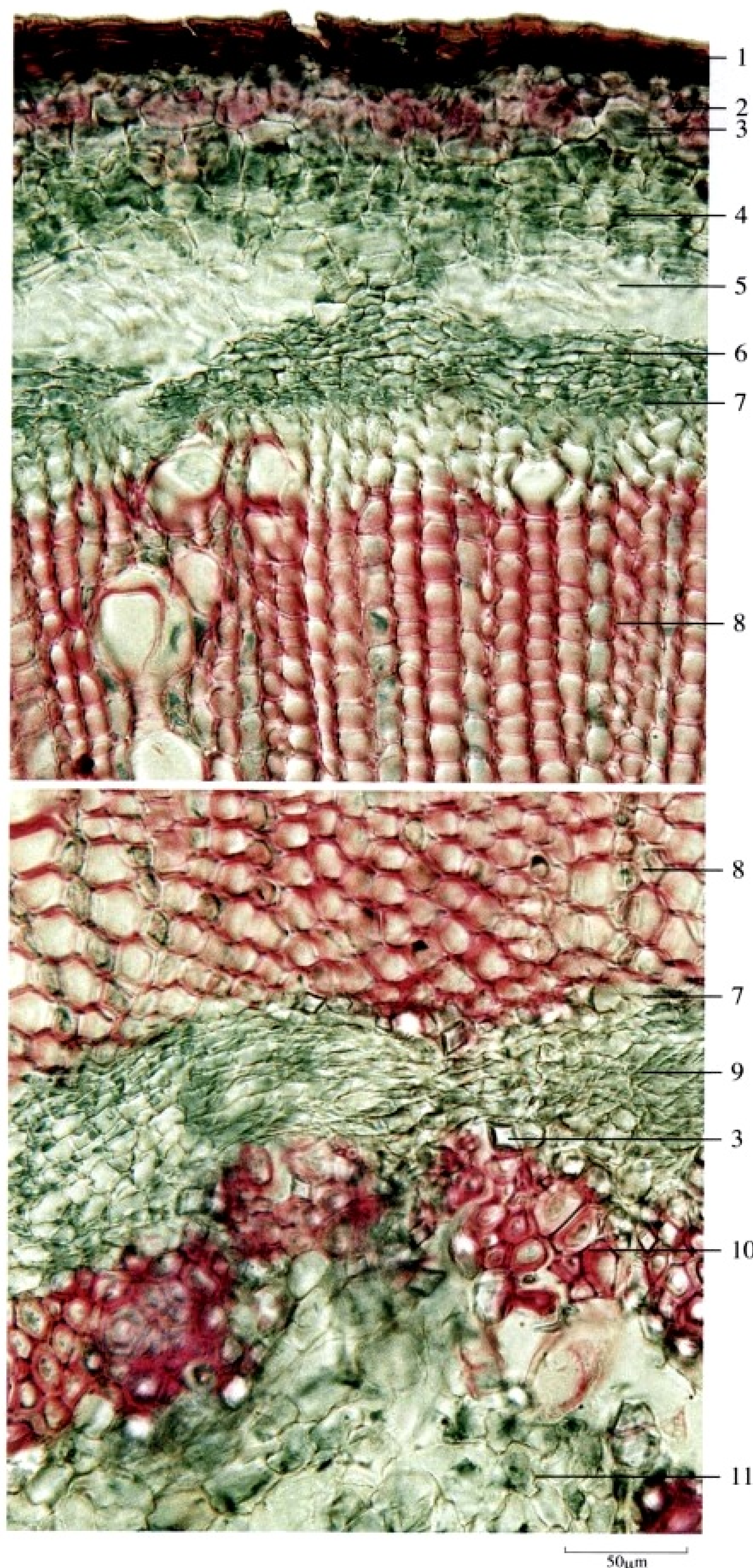
[Fig3 Surface view of leaf from *Andrographis paniculata*]

1. 含钟乳体的晶细胞（Crystal cells containing cystoliths） 2. 下表皮细胞（Lower epidermal cells） 3. 腺鳞（Glandular scales） 4. 非腺毛（Non-glandular hairs）

络 石 藤

Luoshiteng

CAULIS TRACHELOSPERMI



本品为夹竹桃科植物络石*Trachelospermum jasminoides*（Lindl.）Lem. 的干燥带叶藤茎。

[显微特征]　本品茎的横切面：木栓层为棕红色数列木栓细胞；表面可见单细胞非腺毛，壁厚，具壁疣。木栓层内侧为石细胞环带，木栓层与石细胞环带之间有草酸钙方晶分布。皮层狭窄。韧皮部薄，外侧有非木化的纤维束，断续排列成环。形成层成环。木质部均由木化细胞组成，导管多单个散在。木质部内方尚有形成层及内生韧皮部。髓部木化纤维成束，周围薄壁细胞内含草酸钙方晶。髓部常破裂。（图1）

Transverse section of stem: Cork consisting of several layers of brownish-red cells, unicellular non-glandular hairs visible, thick-walled and warty. The inner side of cork showing a cycle of stone cells, prisms of calcium oxalate occurring between cork and cycle of stone cells. Cortex narrow. Phloem thin, non-lignified fibre bundles in the outer side, interruptedly arranged in a ring. Cambium in a ring. Xylem consisting of lignified cells, vessels commonly scattered singly. Cambium and phloem also occurring at the inner part of xylem. Pith usually ruptured, lignified fibres in bundles, surrounded by parenchymatous cells containing prisms of calcium oxalate.（Fig 1）

图1　络石藤（*Trachelospermum jasminoides* 藤茎）横切面
[Fig1　Transverse section of lianoid stem from *Trachelospermum jasminoides*]
1. 木栓层（Cork）　2. 石细胞（Stone cells）　3. 草酸钙方晶（Prisms of calcium oxalate）　4. 皮层（Cortex）　5. 纤维束（Fibre bundles）　6. 韧皮部（Phloem）　7. 形成层（Cambium）　8. 木质部（Xylem）　9. 内生韧皮部（Interal phloem）　10. 纤维束（Fibre bundles）　11. 髓（Pith）

秦 皮

Qinpi

CORTEX FRAXINI

本品为木犀科植物苦枥白蜡树*Fraxinus rhynchophylla* Hance、白蜡树*Fraxinus chinensis* Roxb.、尖叶白蜡树*Fraxinus szaboana* Lingelsh.或宿柱白蜡树*Fraxinus stylosa* Lingelsh. 的干燥枝皮或干皮。

[显微特征] **本品横切面**：木栓层为5～10余列细胞。栓内层为数列多角形厚角细胞。皮层较宽，纤维及石细胞单个散在或成群。中柱鞘部位有石细胞及纤维束组成的环带，偶有间断。韧皮部射线宽1～3列细胞；纤维束及少数石细胞成层状排列，中间贯穿射线，形成“井”字形。薄壁细胞含草酸钙砂晶。(图1～3)

Transverse section: Cork cells in 5 ~ 10 layers. Phelloderm consisting of several layers of polygonal collenchymatous cells. Cortex relatively wide, fibres and stone cells scattered singly or in groups. Annular band composed of stone cells and fibre bundles occurring in pericycle region, occasionally interrupted. Phloem rays 1 ~ 3 cells wide; fibre bundles and a few stone cells arranged in layers, intercrossed by rays, forming "#" shape. Parenchymatous cells containing sand crystals of calcium oxalate. (Fig 1 ~ 3)

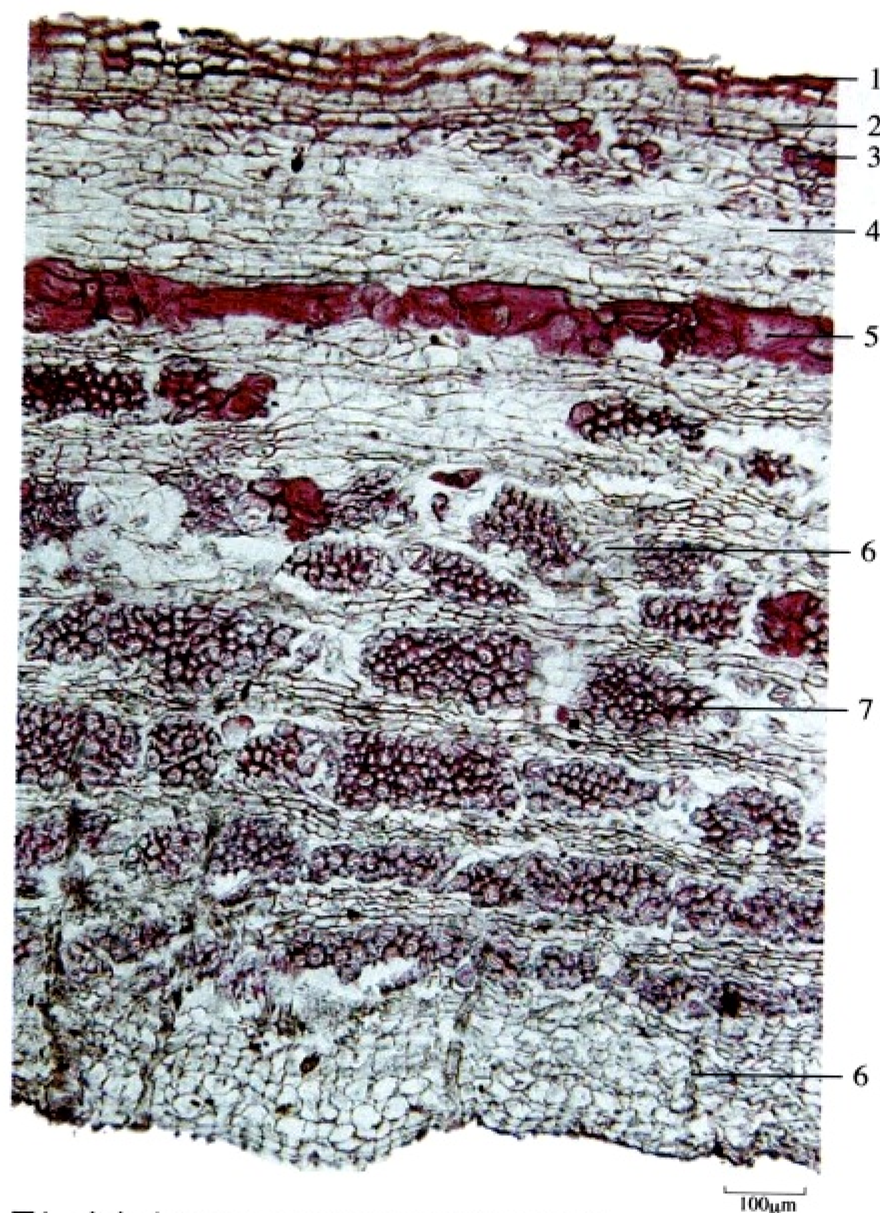


图1 秦皮（*Fraxinus rhynchophylla* 干皮）横切面

[Fig1 Transverse section of stem bark from *Fraxinus rhynchophylla*]

1. 木栓层(Cork) 2. 栓内层(Phelloderm) 3. 纤维(Fibres) 4. 皮层(Cortex) 5. 中柱鞘部位厚壁细胞环带（Sclerenchymatous ring occurring in pericycle） 6. 韧皮射线（Phloem rays） 7. 韧皮纤维（Phloem fibres）



图2 厚壁细胞环带放大，示石细胞和纤维束

[Fig2 Sclerenchymatous ring magnified, showing stone cells and fibre bundles]

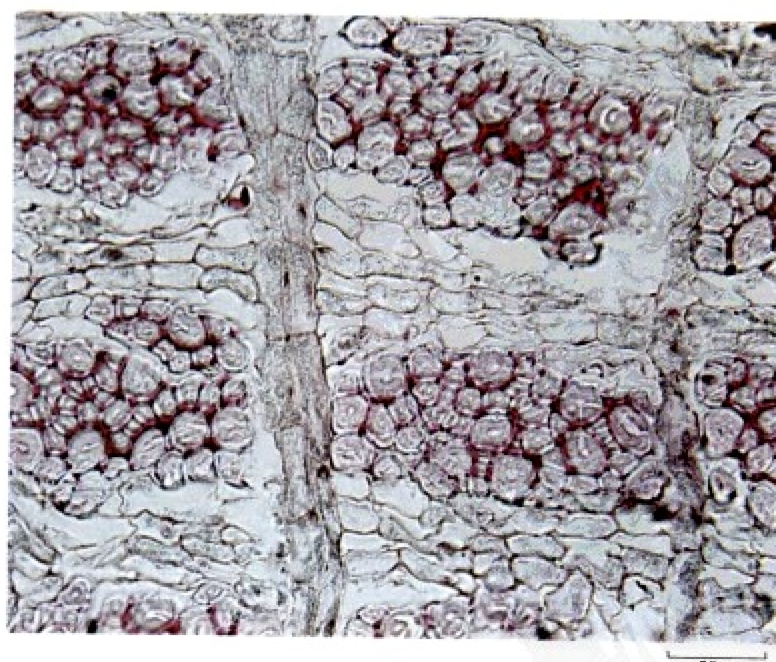


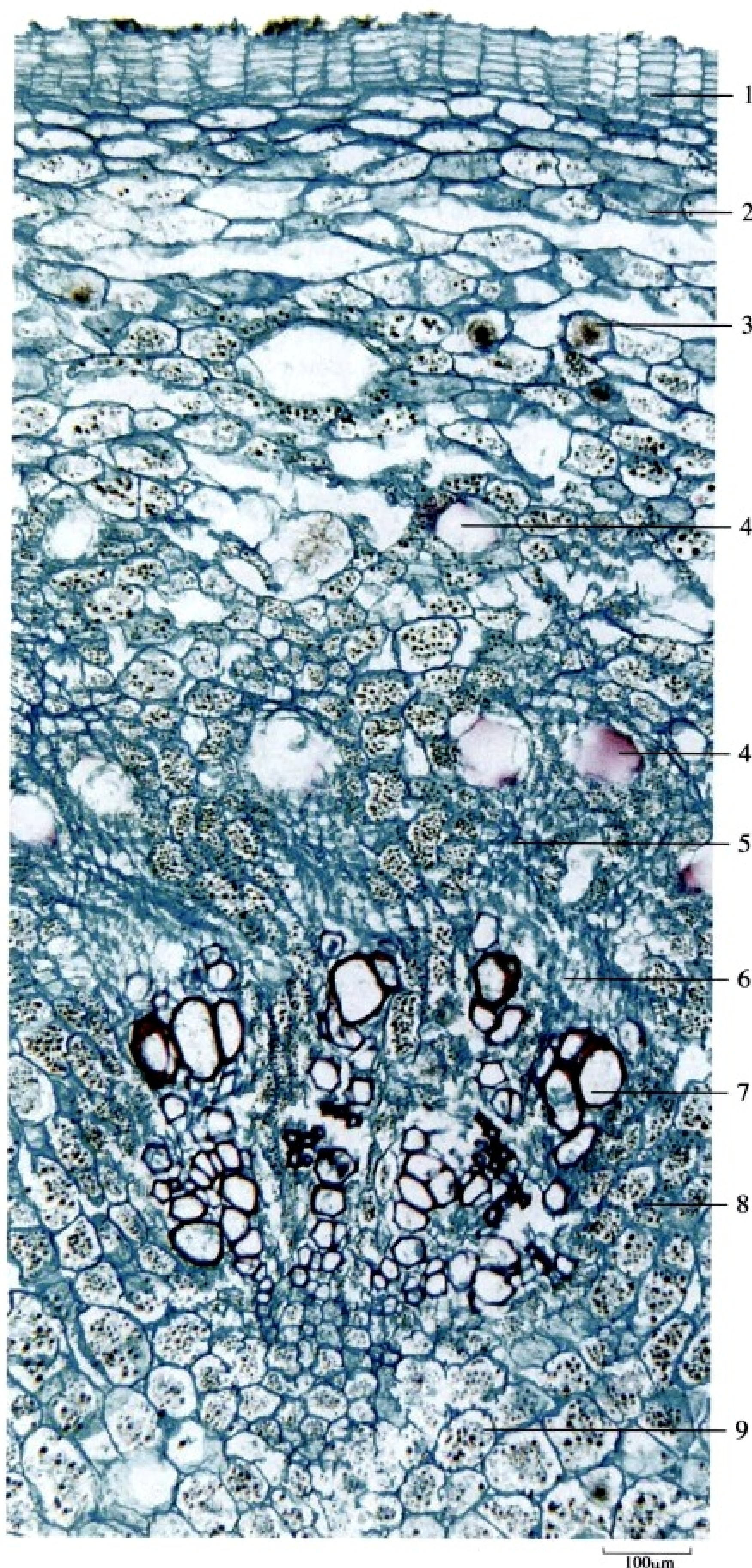
图3 示韧皮部射线与纤维束排成“井”字形，薄壁细胞含草酸钙砂晶

[Fig3 Showing phloem rays and fibre bundles arranged in "#" shape, parenchymatous cells containing sand crystals of calcium oxalate]

珠 子 参

Zhuzishen

RHIZOMA PANACIS MAJORIS



本品为五加科植物珠子参*Panax japonicus* C. A. Mey. var. *major* (Burk.) C. Y. Wu et K. M. Feng或羽叶三七*Panax japonicus* C. A. Mey. var. *bipinnatifidus* (Seem.) C. Y. Wu et K. M. Feng的干燥根茎。

[显微特征] 本品横切面：木栓层为数列木栓细胞。皮层稍窄，有分泌道，呈圆形或长圆形，直径32～500μm，周围分泌细胞5～18个。韧皮部分泌道较小。形成层断续可见。木质部导管呈放射状或"V"字形排列；导管类多角形，直径约至76μm；射线宽广。中央有髓。薄壁细胞含淀粉粒，有的含草酸钙簇晶。(图1)

Transverse section: Cork consisting of several layers of cells. Cortex relatively narrow, with rounded or oblong secretory ducts, 32～500 μm in diameter, surrounded by 5～18 secretory cells. Secretory ducts in phloem relatively small. Cambium in a interrupted ring. Xylem vessels subpolygonal, up to 76 μm in diameter, arranged radially or in V-shape, rays wide. Pith visible. Parenchymatous cells containing starch granules or clusters of calcium oxalate. (Fig 1)

图1 珠子参（*Panax japonicus* var. *major* 根茎）横切面
[Fig1 Transverse section of rhizome from *Panax japonicus* var. *major*]
1. 木栓层（Cork） 2. 皮层（Cortex） 3. 草酸钙簇晶（Clusters of calcium oxalate） 4. 分泌道（Secretory ducts） 5. 韧皮部（Phloem） 6. 形成层（Cambium） 7. 木质部（Xylem） 8. 木射线（Xylem rays） 9. 髓（Pith）

莲　子

Lianzi

SEMEN NELUMBINIS

本品为睡莲科植物莲*Nelumbo nucifera* Gaertn. 的干燥成熟种子。

[显微特征]　**本品粉末：**类白色。主为淀粉粒，单粒长圆形、类圆形、卵圆形或类三角形，有的具小尖突，直径4～25μm，脐点少数可见，裂缝状或点状；复粒稀少，由2～3分粒组成。色素层细胞黄棕色或红棕色，表面观呈类长方形、类长多角形或类圆形，有的可见草酸钙簇晶。子叶细胞呈长圆形，壁稍厚，有的作连珠状，隐约可见纹孔域。可见螺纹和环纹导管。（图1）

Powder: Whitish. Mainly composed of starch granules. Simple granules long rounded, sub-rounded, subtriangular, some with small protruding, 4 ~ 25 μm in diameter, a few hilum visible, cleft or dotted; compound granules rare, consisting of 2 ~ 3 components. Cells of pigmented layer yellowish-brown or reddish-brown, subrectangular or sub-rounded on surface view, sometimes clusters of calcium oxalate visible. Cotyledon cells oblong, walls slightly thickened, some beaded, pitted areas faint. Annular and spiral vessels visible. (Fig 1)



图1　莲子（*Nelumbo nucifera* 种子）粉末

[Fig1　Powder of seed from *Nelumbo nucifera*]

1. 淀粉粒（Starch granules）　2. 色素层细胞（Cells of pigment layer）　3. 草酸钙簇晶（Clusters of calcium oxalate）

4. 子叶细胞（Cotyledon cells）　5. 导管（Vessels）

莲 子 心

Lianzixin

PLUMULA NELUMBINIS

本品为睡莲科植物莲*Nelumbo nucifera* Gaertn. 的成熟种子中的干燥幼叶及胚根。

[显微特征]　本品粉末：灰绿色。表皮细胞略呈长方形，壁薄。叶肉细胞壁薄，类圆形，细胞内含众多淀粉粒与绿色色素。胚根细胞呈长方形，排列整齐，壁非薄，有的含脂肪油滴。幼叶组织中细胞间隙较大。(图1)

Powder: Greyish-green. Epidermal cells rectangular, thin-walled. Mesophyll cells subrounded, thin-walled, containing numerous starch granules and green pigments. Radicle cells rectangular, arranged tidily, walls extremely thin, and some cells containing fatty oil droplets. The tissue of young buds showing relatively large intercellular spaces. (Fig 1)

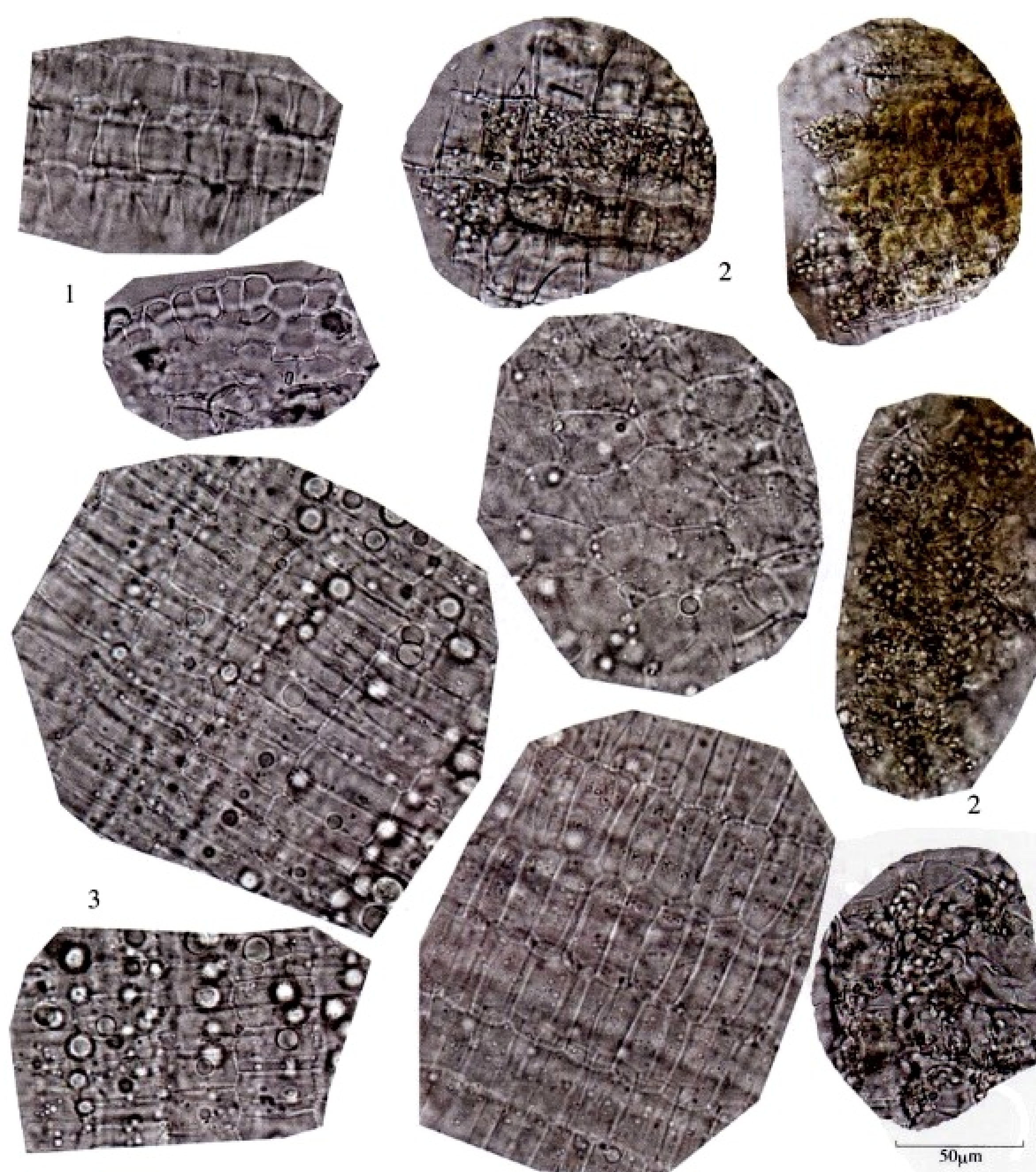


图1　莲子心（*Nelumbo nucifera* 种子中的幼叶及胚根）粉末

[Fig1　Powder of cotyledon and radicle from *Nelumbo nucifera*]

1. 表皮细胞（Epidermal cells）　2. 叶肉细胞（Mesophyll cells）　3. 胚根细胞（Radicle cells）

莲 房

Lianfang

RECEPTACULUM NELUMBINIS

本品为睡莲科植物莲*Nelumbo nucifera* Gaertn. 的干燥花托。

[显微特征]　**本品粉末**：黄棕色。表皮细胞表面观呈多角形，乳头状突起呈双圆圈状。草酸钙簇晶多见，直径10～54μm。棕色细胞类方形或类圆形，壁稍厚，胞腔内充满红棕色物。螺纹、环纹导管直径8～80μm。纤维成束，直径11～35μm，具纹孔。（图1）

Powder: Yellowish-brown. Epidermal cells polygonal in surface view, papilla double circles shaped. Clusters of calcium oxalate numerous, 10 ~ 54 μm in diameter. Brown cells subsquare or subrounded, walls slightly thickened, containing reddish-brown contents in lumina. Spiral and annular vessels 8 ~ 80 μm in diameter. Fibres in bundles, pitted, 11 ~ 35 μm in diameter. (Fig 1)



图1　莲房（*Nelumbo nucifera* 花托）粉末

[Fig1　Powder of receptacle from *Nelumbo nucifera*]

1. 表皮细胞（Epidermal cells）　2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 棕色细胞（Brown cells）　4. 导管（Vessels）　5. 纤维（Fibres）

莲　　须

Lianxu

STAMEN NELUMBINIS

本品为睡莲科植物莲*Nelumbo nucifera* Gaertn. 的干燥雄蕊。

[显微特征]　本品粉末：黄棕色。花粉粒类球形或长圆形，直径45～86μm，具3沟，表面有颗粒网纹。表皮细胞呈长方形、多角形或不规则形，垂周壁微波状弯曲；侧面观外壁呈乳头状突起。花粉囊内壁细胞成片，呈长条形，壁稍厚，胞腔内充满黄棕色或红棕色物。可见螺纹导管。（图1）

Powder: Yellowish-brown. Pollen grains subspherical or oblong, 45～86 μm in diameter, with 3 pit canals and granular reticulate striatfions on the surface. Epidermal cells rectangular, polygonal or irregular, anticlinal walls sinuous; outer walls papillated in lateral view. Cells in inner walls of pollen sacs strip-shaped, thick-walled, and the lumina containing yellowish-brown or reddish-brown contents. Spiral vessels visible.（Fig 1）



图1　莲须（*Nelumbo nucifera* 雄蕊）粉末

[Fig1　Powder of stamen from *Nelumbo nucifera*]

1. 花粉粒（Pollen grains）　2. 表皮细胞（Epidermal cells）　3. 花粉囊内壁细胞（Cells in inner wall of pollen sac）

4. 螺纹导管（Spiral vessels）

莪 术

Ezhu

RHIZOMA CURCUMAE

本品为姜科植物蓬莪术*Curcuma phaeocaulis* Val.、广西莪术*Curcuma kwangsiensis* S. G. Lee et C. F. Liang 或温郁金*Curcuma wenyujin* Y. H. Chen et C. Ling 的干燥根茎。

[显微特征] **本品横切面：**木栓细胞数列，有时已除去。皮层散有叶迹维管束；内皮层明显。中柱较宽，维管束外韧型，散在，沿中柱鞘部位的维管束较小，排列较密。薄壁细胞充满糊化的淀粉粒团块，薄壁组织中有含金黄色油状物的细胞散在。（图1～3）

Transverse section: Cork consisting of several layers of cells, sometime removed. Cortex scattered with leaf trace bundles, endodermis distinct. Stele broad, vascular bundles collateral and scattered, the ones along the pericycle relatively small and closely arranged. Parenchymatous cells filled with gelatinized starch masses, scattered with cells containing golden oils. (Fig 1～3)

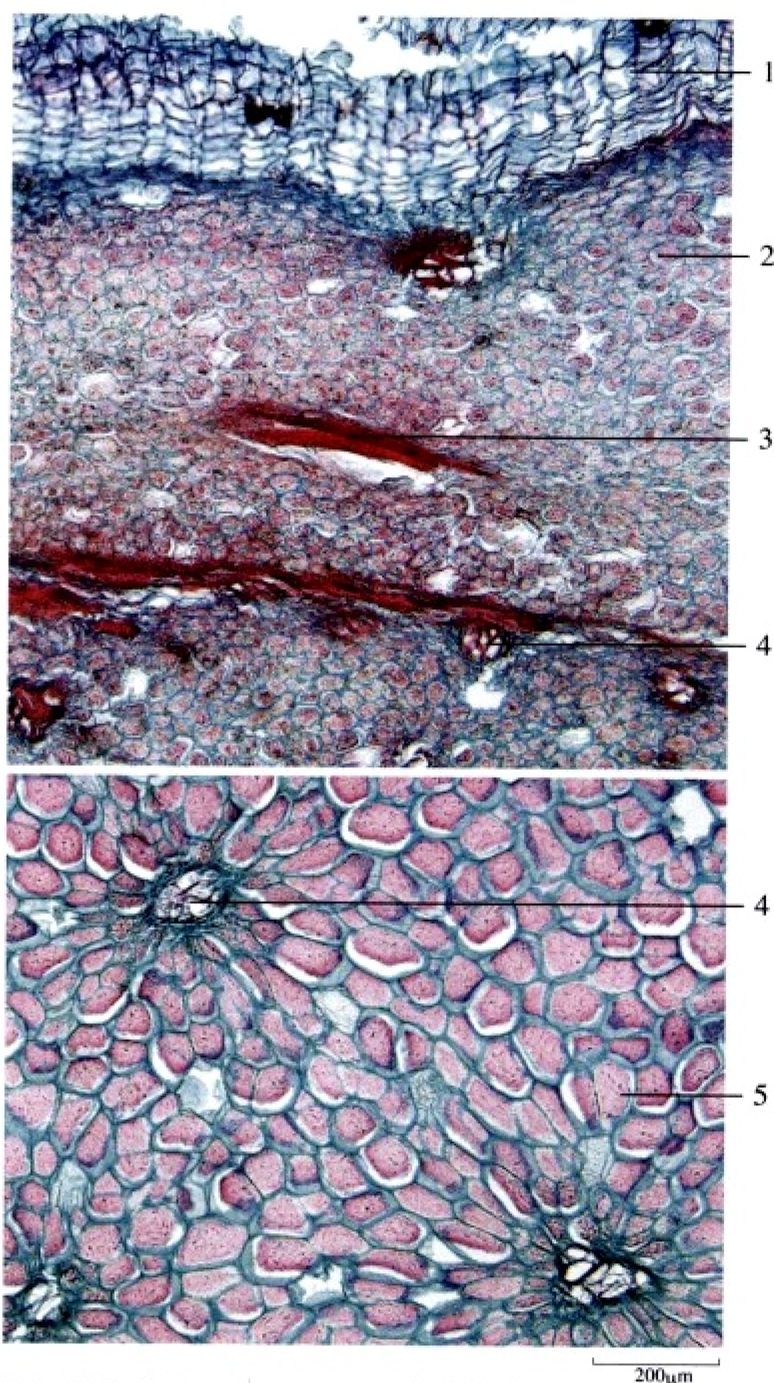


图1 莪术（*Curcuma kwangsiensis* 根茎）横切面

[Fig1 Transverse section of rhizome from *Curcuma kwangsiensis*]

1. 木栓层（Cork） 2. 皮层（Cortex） 3. 叶迹维管束（Leaf trace bundles） 4. 中柱维管束（Vascular bundle in stele） 5. 中柱薄壁细胞（Parenchymatous cells in stele）

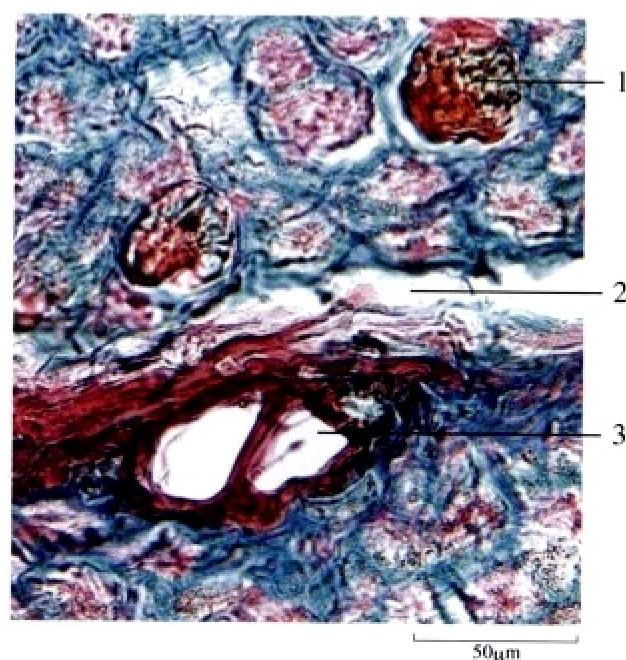


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 油细胞（Oil cells） 2. 内皮层（Endodermis）
3. 中柱维管束导管（Vascular bundles）

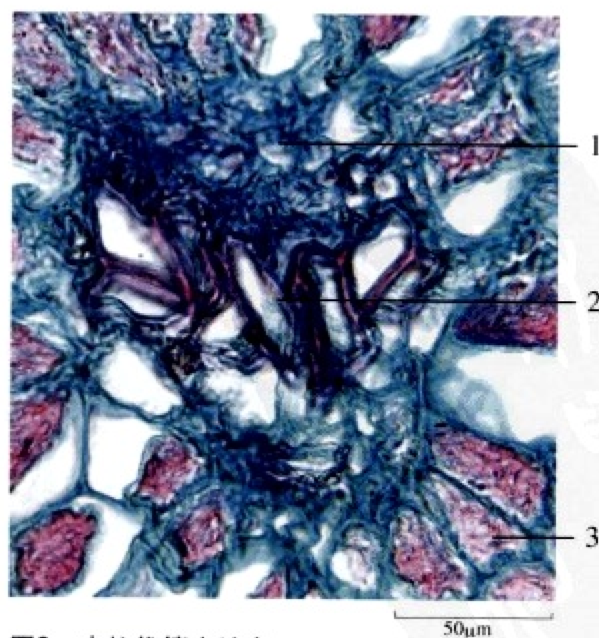


图3 中柱维管束放大

[Fig3 Vascular bundles magnified]

1. 韧皮部（Phloem） 2. 木质部（Xylem）
3. 糊化淀粉粒团块（Gelatinized starch mass）

荷　　叶

Heye

FOLIUM NELUMBINIS

本品为睡莲科植物莲*Nelumbo nucifera* Gaertn. 的干燥叶。

[显微特征]　本品粉末：灰绿色。上表皮细胞表面观多角形，外壁乳头状或短绒毛状突起，呈双圆圈状；断面观长方形，外壁呈乳头状突起；气孔不定式，副卫细胞5～8个。下表皮细胞表面观垂周壁略波状弯曲，有时可见连珠状增厚。草酸钙簇晶多见，直径约至40μm。（图1）

Powder: Greyish-green. Upper epidermal cells polygonal in surface view, with papillary or short tomentose protuberances, two-ring shaped; rectangular in section view, with papillary protuberances; stomata anomocytic, subsidiary cells 5～8. Anticlinal walls of lower epidermal cells slightly sinuous in surface view, sometimes beaded thickened. Clusters of calcium oxalate numerous, up to 40 μm in diameter. （Fig 1）

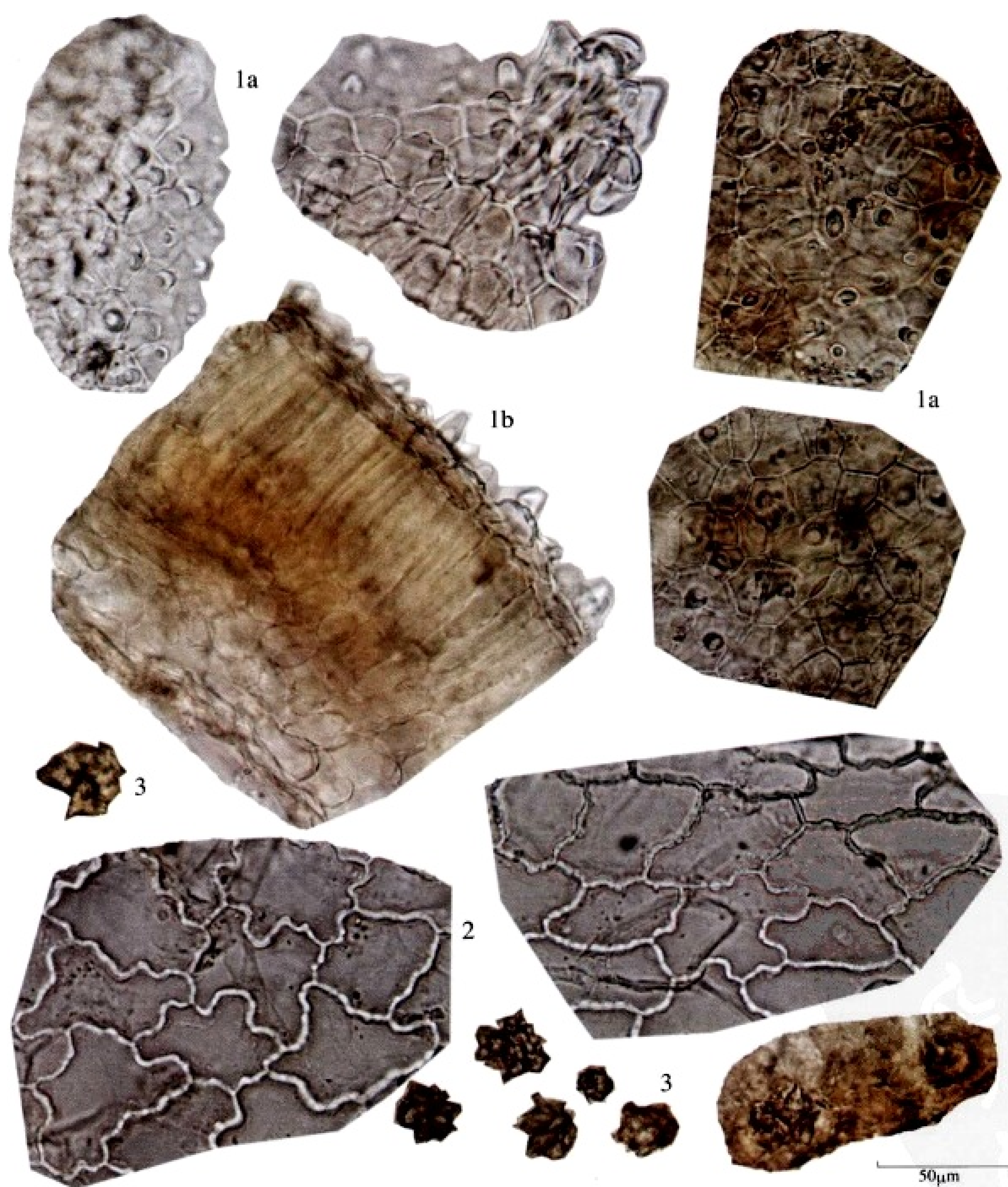


图1　荷叶（*Nelumbo nucifera* 叶）粉末

[Fig1　Powder of leaf from *Nelumbo nucifera*]

1. 上表皮细胞[Upper epidermal cells （a.表面观Surface view　b.断面观Section view）]　2. 下表皮细胞（Lower epidermal cells）　3. 草酸钙簇晶（Clusters of calcium oxalate）

桂 枝
Guizhi
RAMULUS CINNAMOMI

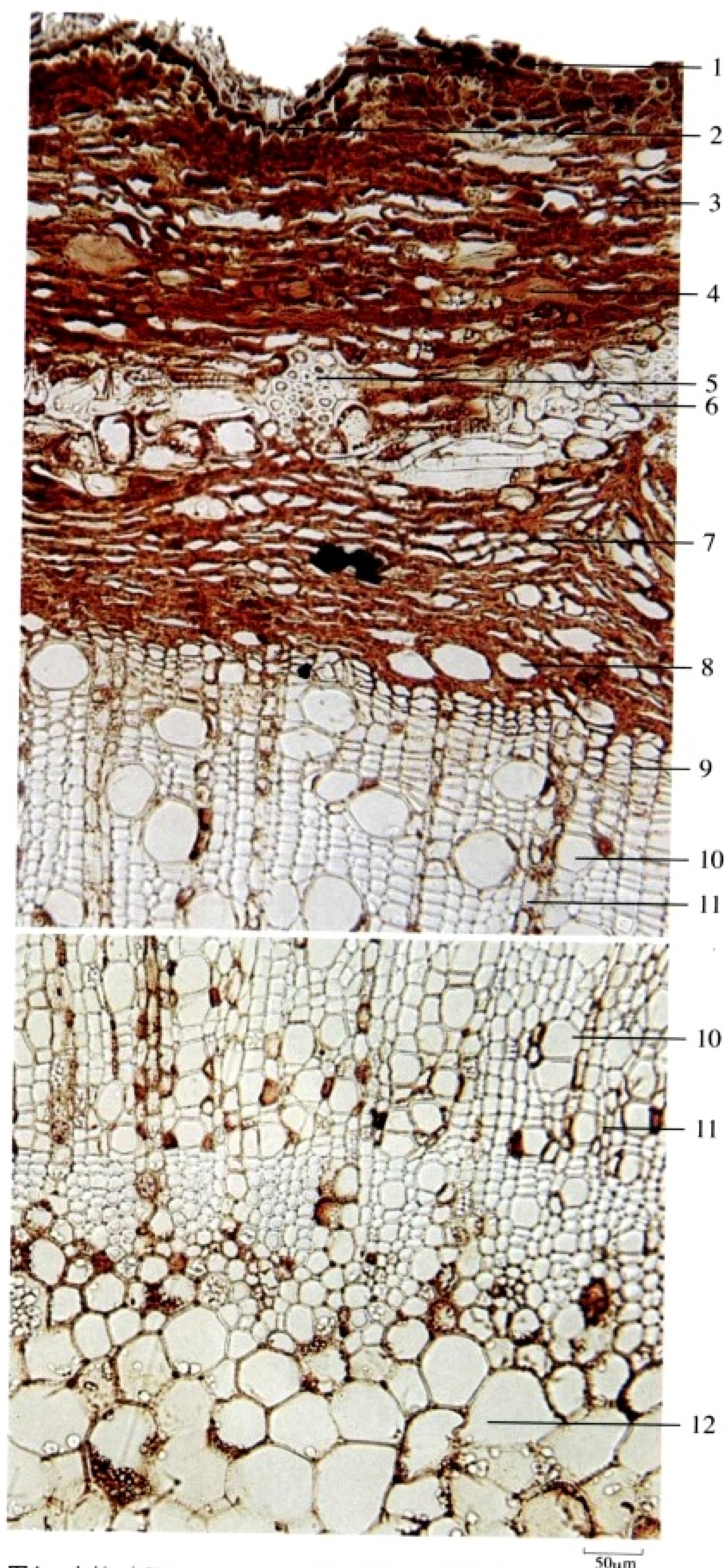


图1 肉桂（*Cinnamomum cassia* 嫩枝）横切面
[Fig1 Transverse section of branchlet from *Cinnamomum cassia*]
1. 表皮（Epidermis） 2. 木栓层（Cork） 3. 皮层（Cortex） 4. 油细胞（Oil cells） 5. 纤维束（Fibre bundles） 6. 石细胞群（Groups of stone cells） 7. 韧皮部（Phloem） 8. 分泌细胞（Secretory cells） 9. 形成层（Cambium） 10. 木质部（Xylem） 11. 木射线（Xylem rays） 12. 髓（Pith）

本品为樟科植物肉桂*Cinnamomum cassia* Presl的干燥嫩枝。

[显微特征]　本品横切面：表皮细胞1列，嫩枝有时可见单细胞非腺毛。木栓细胞3～5列，最内1列细胞外壁增厚。皮层有油细胞及石细胞散在。中柱鞘石细胞群断续排列成环，并伴有纤维束。韧皮部有分泌细胞及纤维散在。形成层明显。木质部射线宽1～2列细胞，含棕色物；导管单个散列或2至数个相聚；木纤维壁较薄，与木薄壁细胞不易区别。髓部细胞壁略厚，木化。射线细胞偶见细小草酸钙针晶。（图1、2）

Transverse section: Epidermis consisting of 1 layer of cells, sometimes unicellular non-glandular hairs visible in young branches. Cork consisting of 3～5 layers of cells, the cells of innermost layer with thickened outer walls. Oil cells and stone cells scattered in cortex. Groups of stone cells in pericycle interruptedly arranged in a ring, accompanied by fibre bundles. Secretory cells and fibres scattered in phloem. Cambium distinct. Xylem rays 1～2 cells wide, containing brown contents; vessels scattered singly or 2 to several aggregated; xylary fibres with relatively thin walls and no obvious difference with xylary parenchymatous cells. In pith, the walls of cells slightly thickened and lignified. Cells of rays containing fine needle crystals of calcium oxalate. (Fig 1, 2)

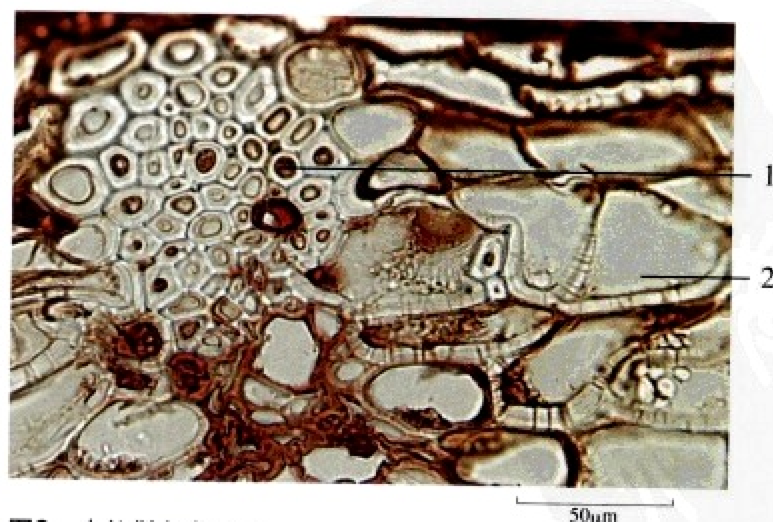


图2 中柱鞘部位放大
[Fig2 Pericycle magnified]
1. 纤维束（Fibre bundles） 2. 石细胞群（Groups of stone cells）

桔　　梗

Jiegeng

RADIX PLATYCODONIS

本品为桔梗科植物桔梗*Platycodon grandiflorum*（Jacq.）A. DC. 的干燥根。

[显微特征]　本品横切面：木栓细胞有时残存，不去外皮者有木栓层，细胞中含草酸钙小棱晶。栓内层窄。韧皮部乳管群散在，乳管壁略厚，内含微细颗粒状黄棕色物。形成层成环。木质部导管单个散列或数个相聚，呈放射状排列。薄壁细胞含菊糖。(图1、2)

Transverse section: Cork cells remaining occasionally, or existed when unpeeled, containing small prisms of calcium oxalate. Phelloderm narrow. Phloem scattered with laticiferous tube groups, laticiferous tube walls somewhat thickened, containing fine granular yellowish-brown contents. Cambium in a ring. Xylem vessels singly scattered or several aggregated in groups, arranged radiately. Parenchymatous cells containing inulin.（Fig 1, 2）

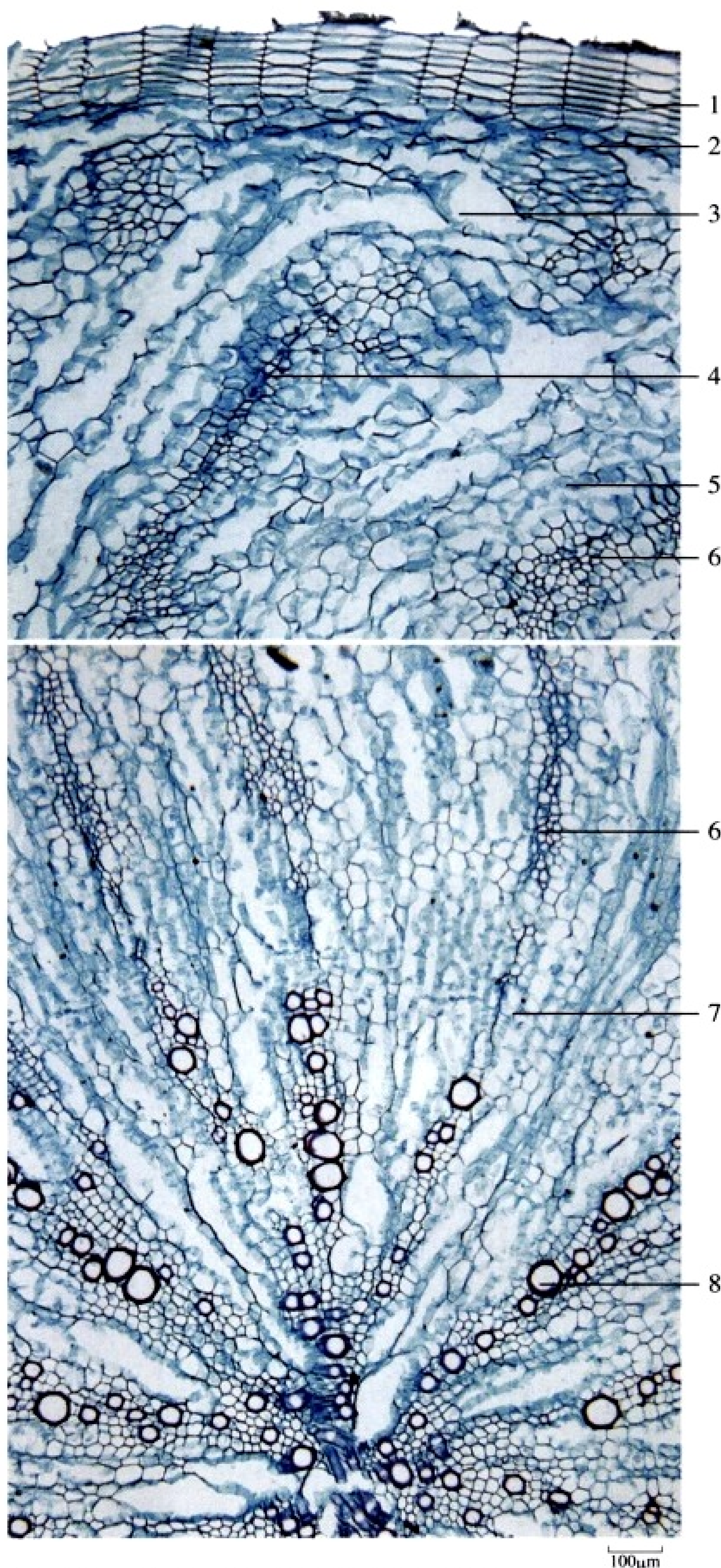


图1　桔梗（*Platycodon grandiflorum* 根）横切面

[Fig1　Transverse section of root from *Platycodon grandiflorum*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 裂隙（Clefts）　4. 乳管群(Laticiferous tube groups)　5. 韧皮射线(Phloem rays)　6. 韧皮部(Phloem)　7. 形成层（Cambium）　8. 木质部（Xylem）

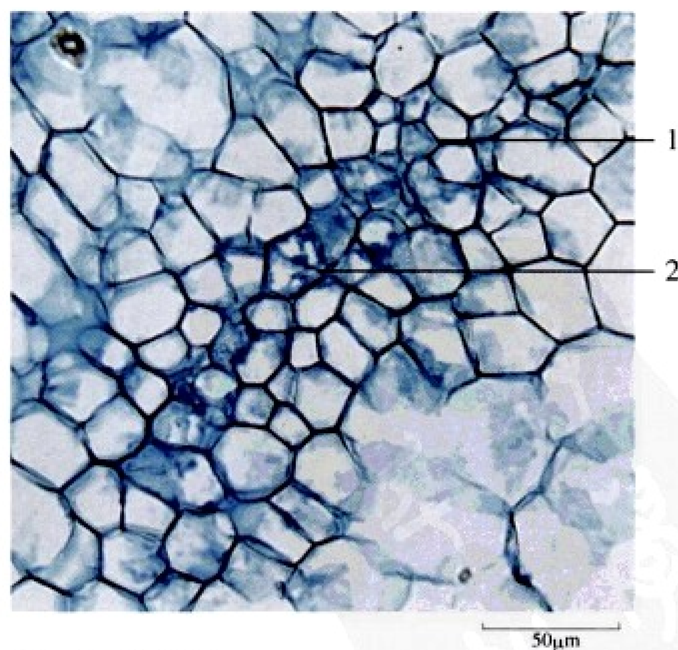


图2　韧皮部放大

[Fig2　Phloem magnified]

1. 筛管群（Sieve tube groups）　2. 乳管群（Laticiferous tube groups）

桃　　仁

Taoren

SEMEN PERSICAE

本品为蔷薇科植物桃*Prunus persica*（L.）Batsch或山桃*Prunus davidiana*（Carr.）Franch. 的干燥成熟种子。

[显微特征]　本品种皮粉末（或解离）：桃仁　石细胞黄色或黄棕色，侧面观贝壳形、盔帽形、弓形或椭圆形，高54～153μm，底部宽约至180μm，壁一边较厚，层纹细密；表面观类圆形、圆多角形或类方形，底部壁上纹孔大而较密。（图1）

Powdered or isolated testa tissue：*Prunus persica*　Stone cells yellow or yellowish-brown, conchoidal, helmet-shaped, bow-shaped or elliptic in lateral view, 54～153 μm high, up to 180 μm wide at the base, walls of one side thicker and more densely striated than that of the other side; subrounded, rounded, polygonal or sub-square in surface view, with large and dense pits in bottom walls.（Fig 1）



图1　桃仁（*Prunus persica* 种子）粉末

[Fig1　Powder of testa from *Prunus persica*]

山桃仁 石细胞淡黄色、橙黄色或橙红色，侧面观贝壳形、矩圆形、椭圆形或长条形，高81～198（279）μm，宽约至128（198）μm；表面观类圆形、类六角形、长多角形或类方形，底部壁厚薄不匀，纹孔较小。（图2）

Prunus davidiana: Stone cells pale yellow, orange-yellow or orange-red, conchoidal, oblong, elliptic or strip-shaped in lateral view, 81 ~ 198 （279） μm high, about 128 （198） μm wide; subrounded, subhexagonal, oblong polygonal or subsquare in surface view, walls unevenly thickened at bottom with smaller pits. （Fig 2）



图2 桃仁（*Prunus davidiana* 种子）粉末
[Fig2 Powder of testa from *Prunus davidiana*]

党　　参

Dangshen

RADIX CODONOPSIS

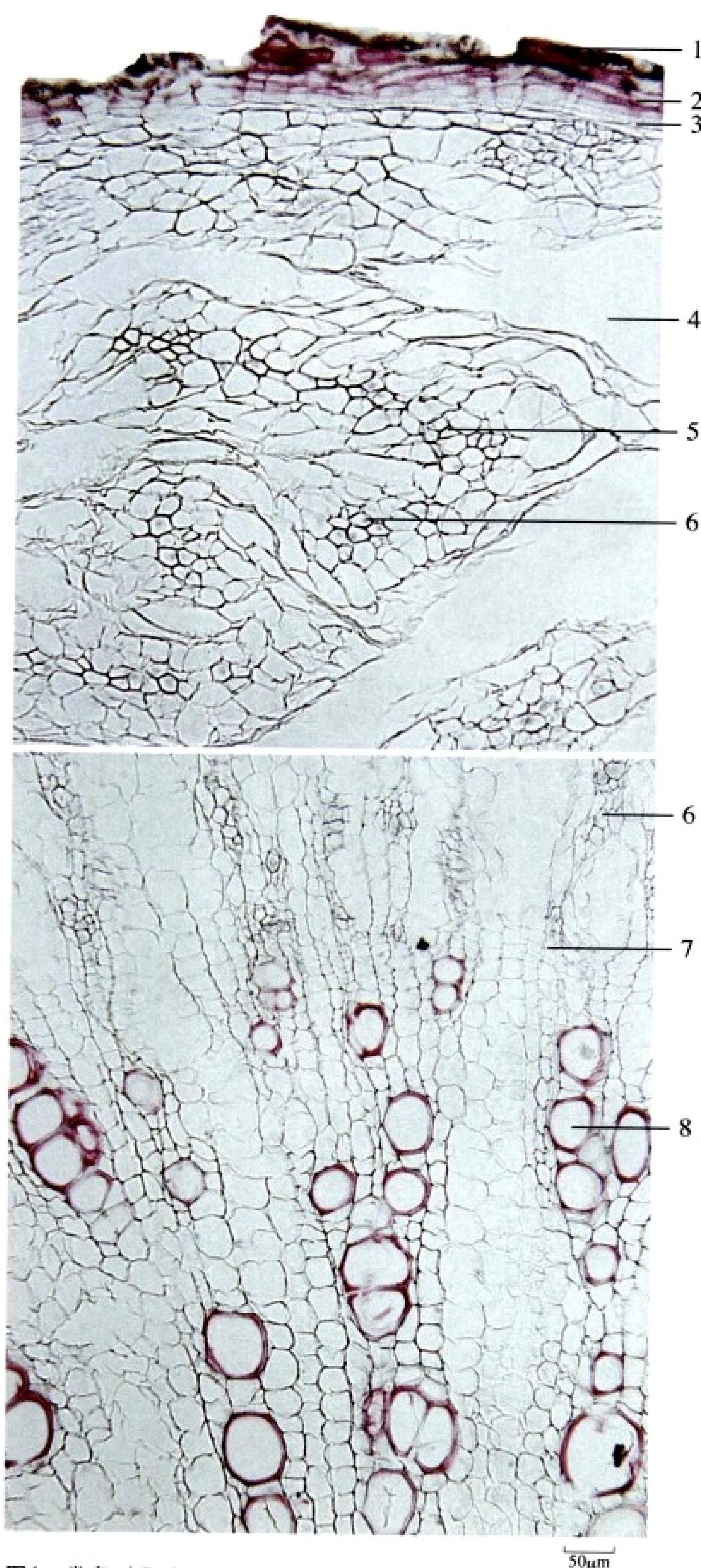


图1　党参（*Codonopsis pilosula* 根）横切面

[Fig1　Transverse section of root from *Codonopsis pilosula*]

1. 石细胞（Stone cells）　2. 木栓层（Cork）　3. 栓内层（Phelloderm）
4. 裂隙（Clefts）　5. 韧皮部乳管群（Phloem laticiferous tube groups）
6. 韧皮部筛管群（Phloemsieve tube groups）　7. 形成层（Cambium）
8. 木质部（Xylem）

本品为桔梗科植物党参*Codonopsis pilosula*（Franch.）Nannf.、素花党参*Codonopsis pilosula* Nannf. var. *modesta*（Nannf.）L. T. Shen或川党参*Codonopsis tangshen* Oliv. 的干燥根。

[显微特征]　**本品横切面：**木栓细胞数列至10数列，外侧有石细胞，单个或成群。栓内层窄。韧皮部宽广，外侧常现裂隙，散有淡黄色乳管群，并常与筛管群交互排列。形成层成环。木质部导管单个散列或数个相聚，呈放射状排列。薄壁细胞含菊糖。（图1、2）

Transverse section: Cork consisting of several to ten or more layers of cells, stone cells present at the outer side, single or grouped. Phelloderm narrow. Phloem broad, often with cracks at the outer side, and pale yellow laticiferous tube in groups, scattered throughout and frequently alternated with sieve tube groups. Cambium in a ring. Xylem vessels singly scattered or aggregated in groups, arranged radially. Parenchymatous cells containing inulin.（Fig 1, 2）

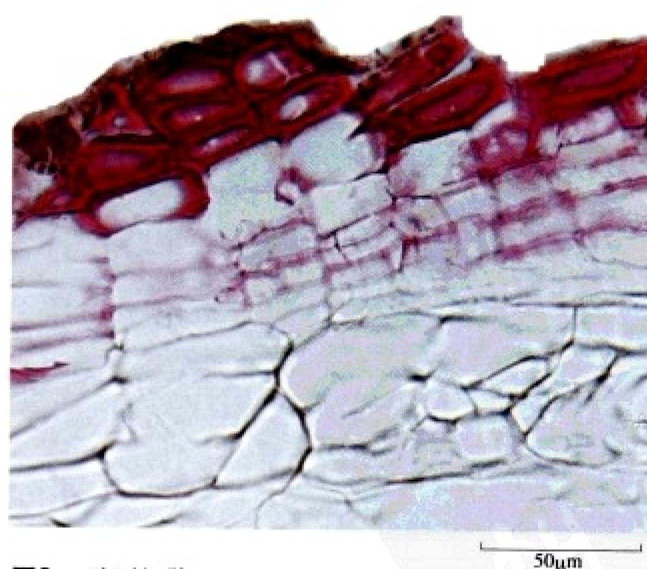


图2　示石细胞

[Fig2　Showing stone cells]

鸭跖草
Yazhicao
HERBA COMMELINAE

本品为鸭跖草科植物鸭跖草*Commelina communis* L.的干燥地上部分。

[显微特征]　**本品叶的表面观：**非腺毛有两种，均为2细胞，一种短锥形，长45～60μm，壁较厚，基部细胞直径约45μm，顶端细胞短尖；另一种棒形，基部细胞长45～60μm，壁稍厚，顶端细胞较长，先端钝圆，壁薄，常脱落。草酸钙针晶较多，长至74μm。（图1）

Surface view of leaf: Non-grandular hairs of two types, both bicellular, one type in short conical shape, 45～60 μm long, walls relatively thickened, basal cells about 45 μm in diameter, apical cells short and pointed; another type in clavate shape, basal cell 45～60 μm long, walls slightly thickened, apical cells relatively long, the apex obtuse, thin-walled, often fallen off. Needle crystals of calcium oxalate abundant, up to 74 μm long.（Fig 1）



图1　鸭跖草（*Commelina communis*叶）表面观

[Fig1　Surface view of leaf from *Commelina communis*]

1. 棒形非腺毛（Non-grandular hairs in clavate shape）　2. 短锥形非腺毛（Non-grandular hairs in short conical shape）　3. 草酸钙针晶（Needle crystals of calcium oxalate）

积　雪　草

Jixuecao

HERBA CENTELLAE

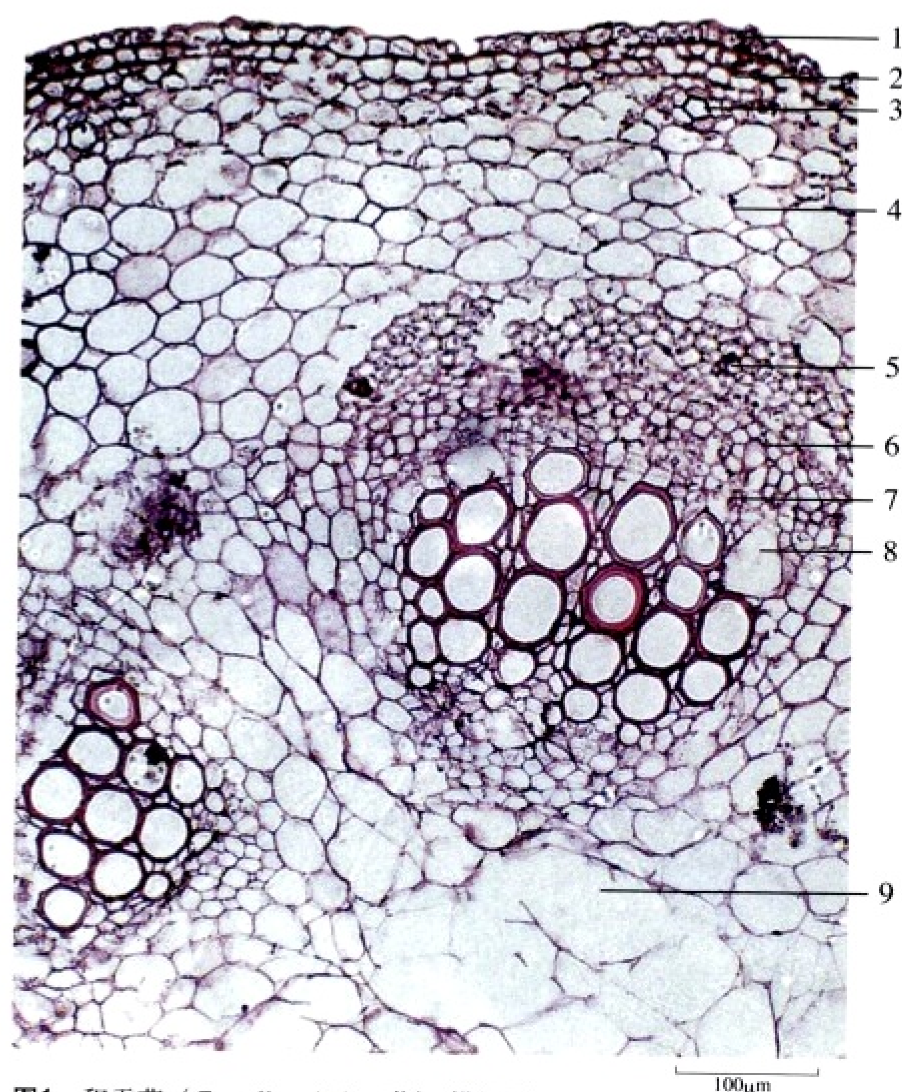


图1　积雪草（*Centella asiatica* 茎）横切面
[Fig1　Transverse section of stem from *Centella asiatica*]
1.表皮（Epidermis）　2. 厚角细胞（Collenchymatous cells）　3. 分泌道（Secretory canals）　4. 皮层（Cortex）　5. 纤维群（Fibre groups）　6. 韧皮部（Phloem）　7. 形成层（Cambium）　8. 木质部（Xylem）　9. 髓部（Pith）

本品为伞形科植物积雪草 *Centella asiatica*（L.）Urb. 的干燥全草。

［显微特征］　**本品茎的横切面**：表皮细胞类圆形或近方形。下方为2～4列厚角细胞。外韧型维管束6～7个；韧皮部外侧为微木化的纤维群。束内形成层明显，木质部导管径向排列。髓部较大。皮层和射线中可见分泌道，直径23～34μm，周围分泌细胞5～7个。（图1～3）

Transverse section of stem: Epidermal cells subrounded or subsquare, 2～4 layers of collenchymatous cells occurring beneath. Collateral vascular bundles 6～7; slightly lignified fibre groups occurring outside of phloem. Fascicular cambium distinct; xylem vessels radically arranged. Pith large. Secretory canals observed in cortex and rays, 23～24μm in diameter, composed of 5～7 secretory cells.（Fig 1～3）

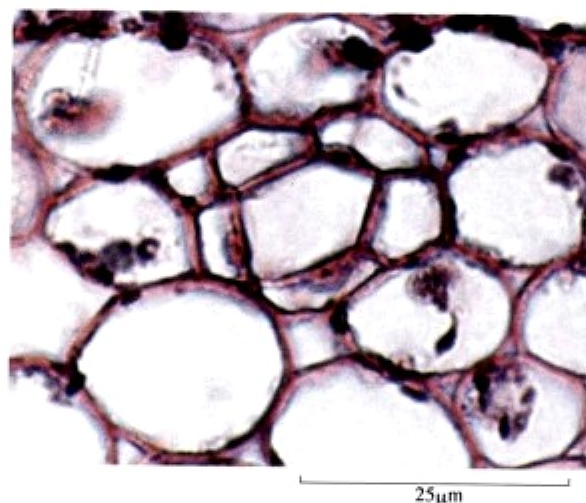


图2　示分泌道
[Fig2　Showing secretory canal]

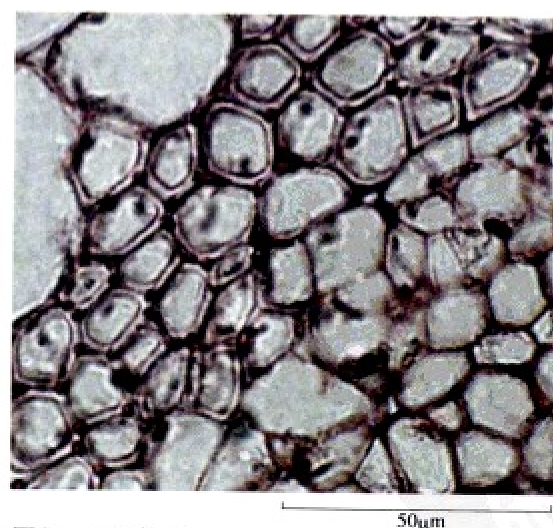


图3　示纤维群
[Fig 3 Showing fibre group]

本品叶表面观：上、下表皮细胞均呈多边形；气孔不等式或不定式，上表皮较少，下表皮较多。（图4）

Surface view of leaf: Upper and lower epidermal cells polygonal; stomata anomocytic or anisocytic, more frequent observed on the lower epidermis.（Fig 4）

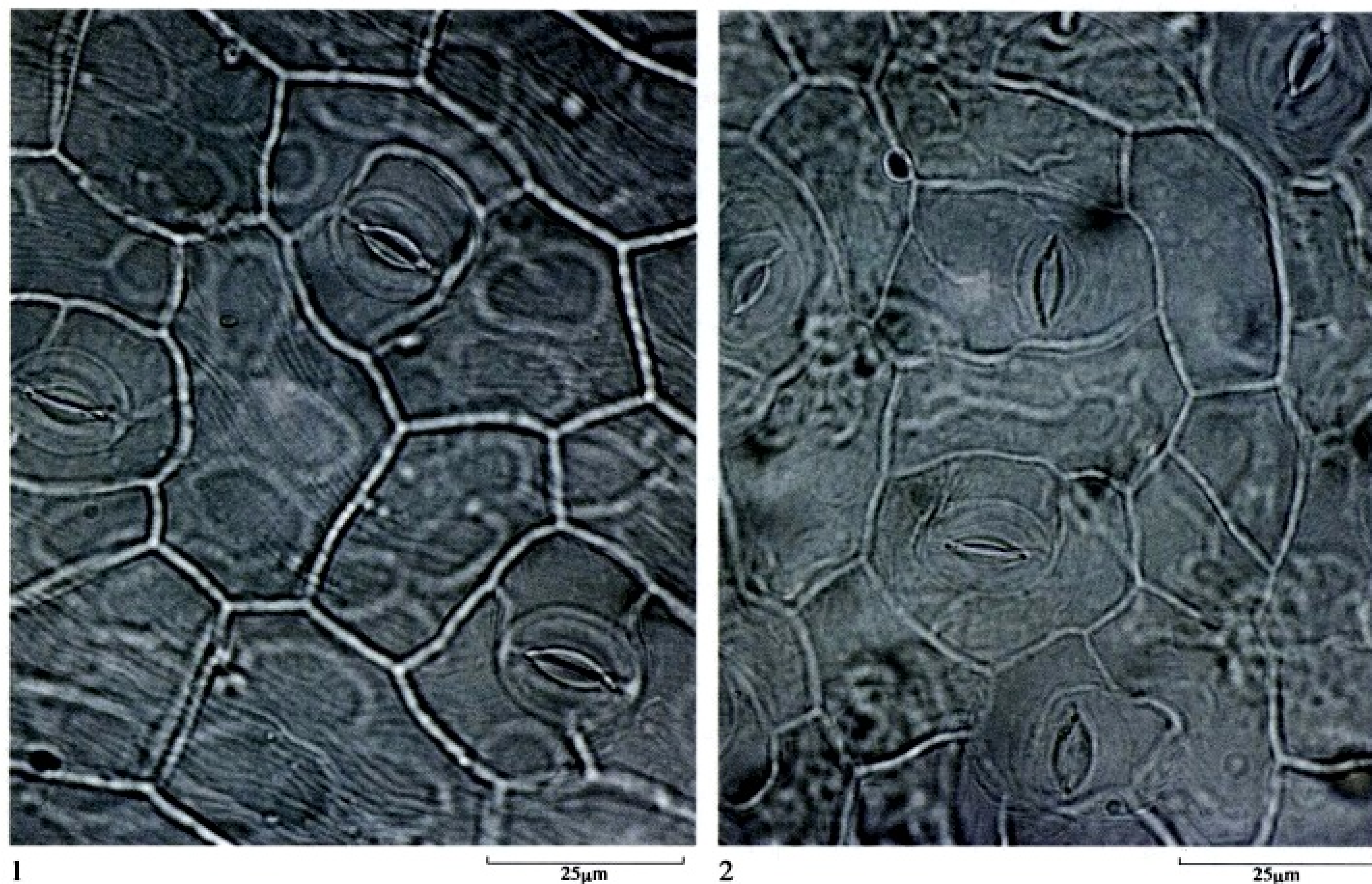


图4 积雪草（*Centella asiatica* 叶）表面观

[Fig4 Surface view of leaf from *Centella asiatica*]

1. 上表皮细胞及气孔（Upper epidermis cells and stomata） 2. 下表皮细胞及气孔（Lower epidermis cells and stomata）

射　干

Shegan

RHIZOMA BELAMCANDAE

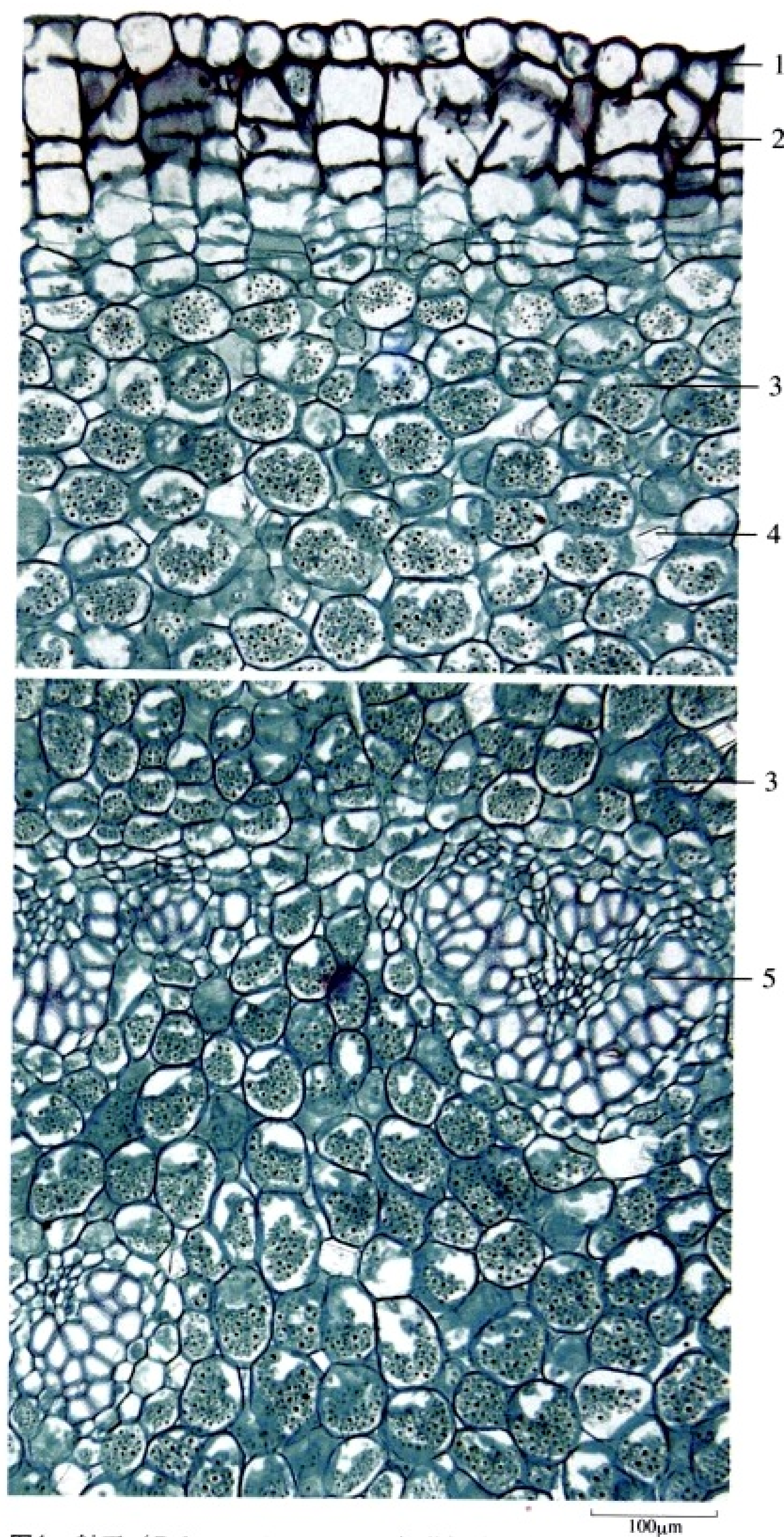


图1　射干（*Belamcanda chinensis* 根茎）横切面

[Fig1　Transverse section of rhizome from *Belamcanda chinensis*]

1. 表皮（Epidermis）　2. 木栓层（Cork）　3. 皮层（Cortex）　4. 草酸钙柱晶（Prisms of calcium oxalate）　5. 维管束（Vascular bundles）

本品为鸢尾科植物射干 *Belamcanda chinensis*（L.） DC. 的干燥根茎。

[显微特征]　本品横切面：表皮有时残存。木栓细胞多列。皮层稀有叶迹维管束；内皮层不明显。中柱维管束为周木型及外韧型，靠外侧排列较紧密。薄壁组织中含有草酸钙柱晶、淀粉粒及油滴。（图1～3）

Transverse section: Remaining epidermis sometimes visible. Cork consisting of several layers of cells. Cortex sparsely scattered with leaf trace bundles; endodermis indistinct. Vascular bundles of stele amphivasal and collateral, densely arranged at the outer side. Parenchymatous cells containing prisms of calcium oxalate, starch granules and oil drops. (Fig 1～3)

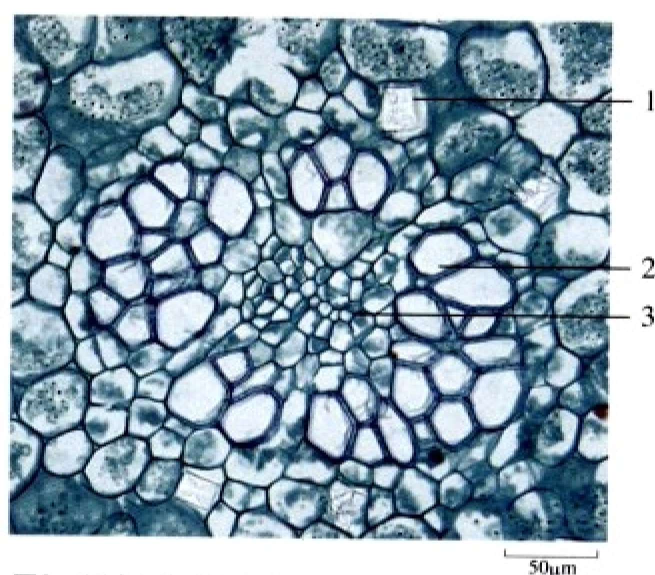


图2　周木型维管束放大

[Fig2　Amphivasal vascular bundles magnified]

1. 草酸钙柱晶（Prisms of calcium oxalate）

2. 木质部（Xylem）　3. 韧皮部（Phloem）



图3　示草酸钙柱晶

[Fig3　Showing prisms of calcium oxalate]

本品粉末：橙黄色。草酸钙柱晶较多，棱柱形，多已破碎，完整者长49～240（315）μm，直径约至49μm。淀粉粒单粒圆形或椭圆形，直径2～17μm，脐点点状；复粒极少，由2～5分粒组成。薄壁细胞类圆形或椭圆形，壁稍厚或连珠状增厚，有单纹孔。木栓细胞棕色，垂周壁微波状弯曲，有的含棕色物。(图4)

Powder: Orange. Prisms of calcium oxalate abundant, often broken, the intact ones 49～240 (315) μm long, up to 49 μm in diameter. Simple starch granules subrounded or ellipsoidal, 2～17 μm in diameter, hilum dotted; compound granules extremely less, composed of 2～5 components. Parenchymatous cells subrounded or ellipsoidal, walls slightly thickened or beaded, with simple pits. Cork cells brown, anticlinal walls slightly sinuous, some containing brown contents. (Fig 4)



图4 射干（*Belamcanda chinensis* 根茎）粉末

[Fig 4 Powder of rhizome from *Belamcanda chinensis*]

1. 草酸钙柱晶（Prisms of calcium oxalate） 2. 淀粉粒（Starch granules） 3. 薄壁细胞（Parenchymatous cells） 4. 木栓细胞（Cork cells）

凌　霄　花

Lingxiaohua

FLOS CAMPSIS

本品为紫葳科植物凌霄*Campsis grandiflora*（Thunb.） K. Schum. 或美洲凌霄*Campsis radicans*（L.） Seem. 的干燥花。

[显微特征]　**本品粉末**：黄棕色。花粉粒类圆形，直径24～31μm，具3孔沟，表面有极细密的网状雕纹。腺毛淡黄色或黄棕色，头部多细胞，呈扁圆形、类圆形或长圆形，侧面观细胞似栅状排列1～2层，柄部1～3细胞。花冠表皮细胞类多角形；具螺纹导管。（图1）

Powder: Yellowish-brown. Pollen grains subrounded, 24～31 μm in diameter, with 3 furrows, surface bearing extremely fine reticulate strations. Glandular hairs yellowish or yellowish-brown, multicelluar heads ellipsoid, subrounded or oval, 1～2 layer of cells arranged in palisade-like in lateral view, stalks 1～3 celled. Epidermal cells of corolla subpolygonal; spiral vessels visible.（Fig 1）



图1　凌霄花（*Campsis radicans* 花）粉末

[Fig1　Powder of flower from *Campsis radicans*]

1. 花粉粒（Pollen grains）　2. 腺毛（Glandular hairs）　3. 花冠表皮细胞（Epidermal cells of corolla）

高 良 姜

Gaoliangjiang

RHIZOMA ALPINIAE OFFICINARUM

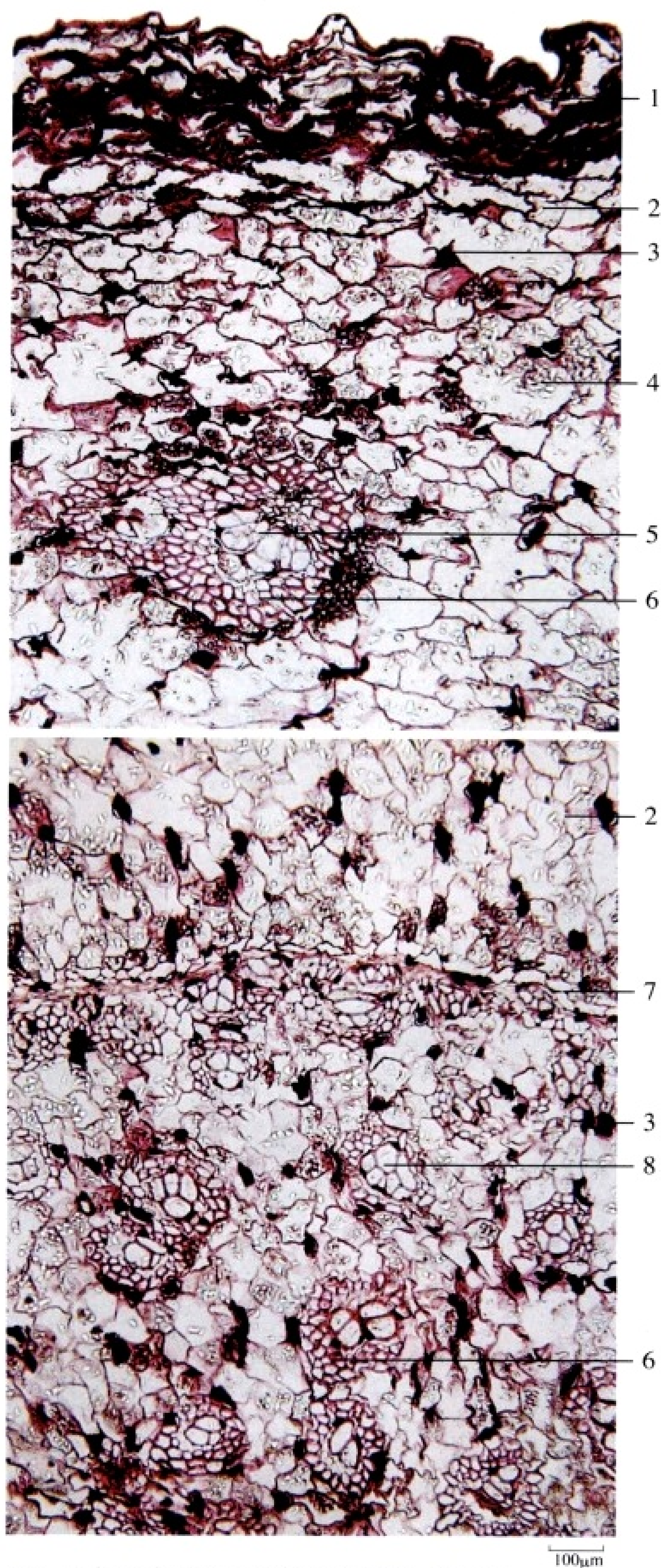


图1 高良姜（*Alpinia officinarum* 根茎）横切面

[Fig1 Transverse section of rhizome from *Alpinia officinarum*]

1. 表皮（Epidermis） 2. 皮层（Cortex） 3. 分泌细胞（Secretory cells） 4. 淀粉粒（Starch granules） 5. 叶迹维管束（Leaf trace vascular bundles） 6. 束鞘纤维（Vascular bundle sheath fibres） 7. 内皮层（Endodermis） 8. 中柱维管束（Stele vascular bundle）

本品为姜科植物高良姜*Alpinia officinarum* Hance 的干燥根茎。

[显微特征]　本品横切面：表皮细胞外壁增厚，有的含红棕色物。皮层中叶迹维管束较多，外韧型；内皮层明显。中柱外韧型维管束甚多，束鞘纤维成环，木化。皮层及中柱薄壁组织中散有多数分泌细胞，内含黄色或红棕色树脂状物；薄壁细胞充满淀粉粒。（图1、2）

Transverse section: Outer walls of epidermal cells thickened, some cells containing reddish-brown masses. Vascular bundles of leaf trace relatively abundant in cortex, collateral. Endodermis distinct. Collateral vascular bundles numerous in stele, vascular bundle sheath fibres arranged in a ring and lignified. Secretory cells abundantly scattered in parenchyma of cortex and stele, containing yellow or reddish-brown resinous contents. Parenchymatous cells filled with starch granules.（Fig 1, 2）

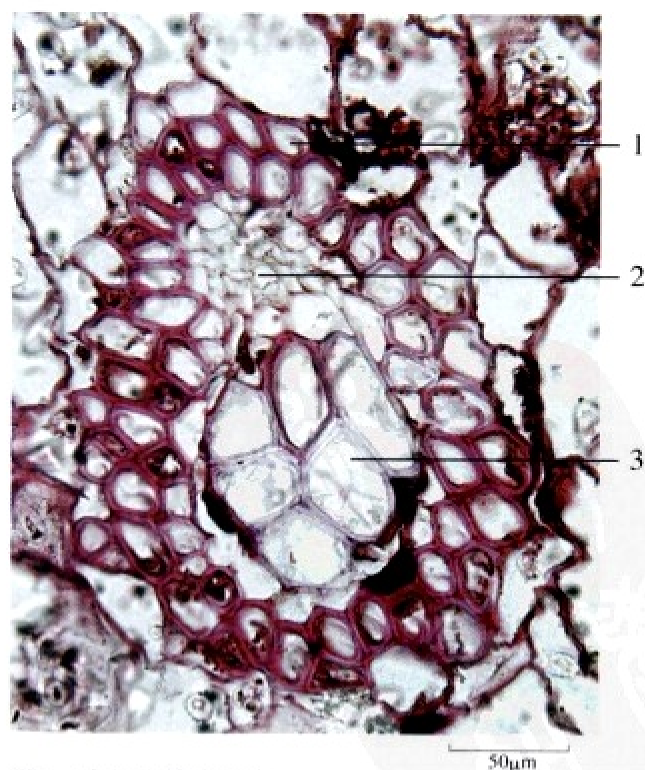


图2 中柱维管束放大

[Fig2 Vascular bundle in stele magnified]

1. 束鞘纤维（Vascular bundle sheath fibres） 2. 韧皮部（Phloem） 3. 木质部（Xylem）

拳　参
Quanshen
RHIZOMA BISTORTAE

本品为蓼科植物拳参*Polygonum bistorta* L. 的干燥根茎。

[显微特征]　**本品粉末：**淡棕红色。木栓细胞多角形，含棕红色物。草酸钙簇晶甚多，直径15～65μm。具缘纹孔导管直径20～55μm，亦有网纹及螺纹导管。纤维长梭形，直径10～20μm，壁较厚，木化，孔沟明显。淀粉粒单粒椭圆形、卵形或类圆形，直径5～12μm。（图1）

Powder: Pale brownish-red. Cork cells polygonal, containing brownish-red contents. Clusters of calcium oxalate fairly abundant, 15 ~ 65 μm in diameter. Bordered pitted vessels 20 ~ 55 μm in diameter, reticulated and spiral vessels visible. Fibres long fusiform, 10 ~ 20 μm in diameter, walls relatively thickened, lignified, with distinct pit-canals. Simple starch granules ellipsoidal, ovoid or subspheroidal, 5 ~ 12 μm in diameter. (Fig 1)



图1　拳参（*Polygonum bistorta* 根茎）粉末

[Fig1　Powder of rhizome from *Polygonum bistorta*]

1. 木栓细胞（Cork cells）　2. 草酸钙簇晶（Clusters of calcium oxalate）　3. 导管（Vessels）　4. 纤维（Fibres）
5. 淀粉粒（Starch granules）

粉 萆 薢

Fenbixie

RHIZOMA DIOSCOREAE HYPOGLAUCAE

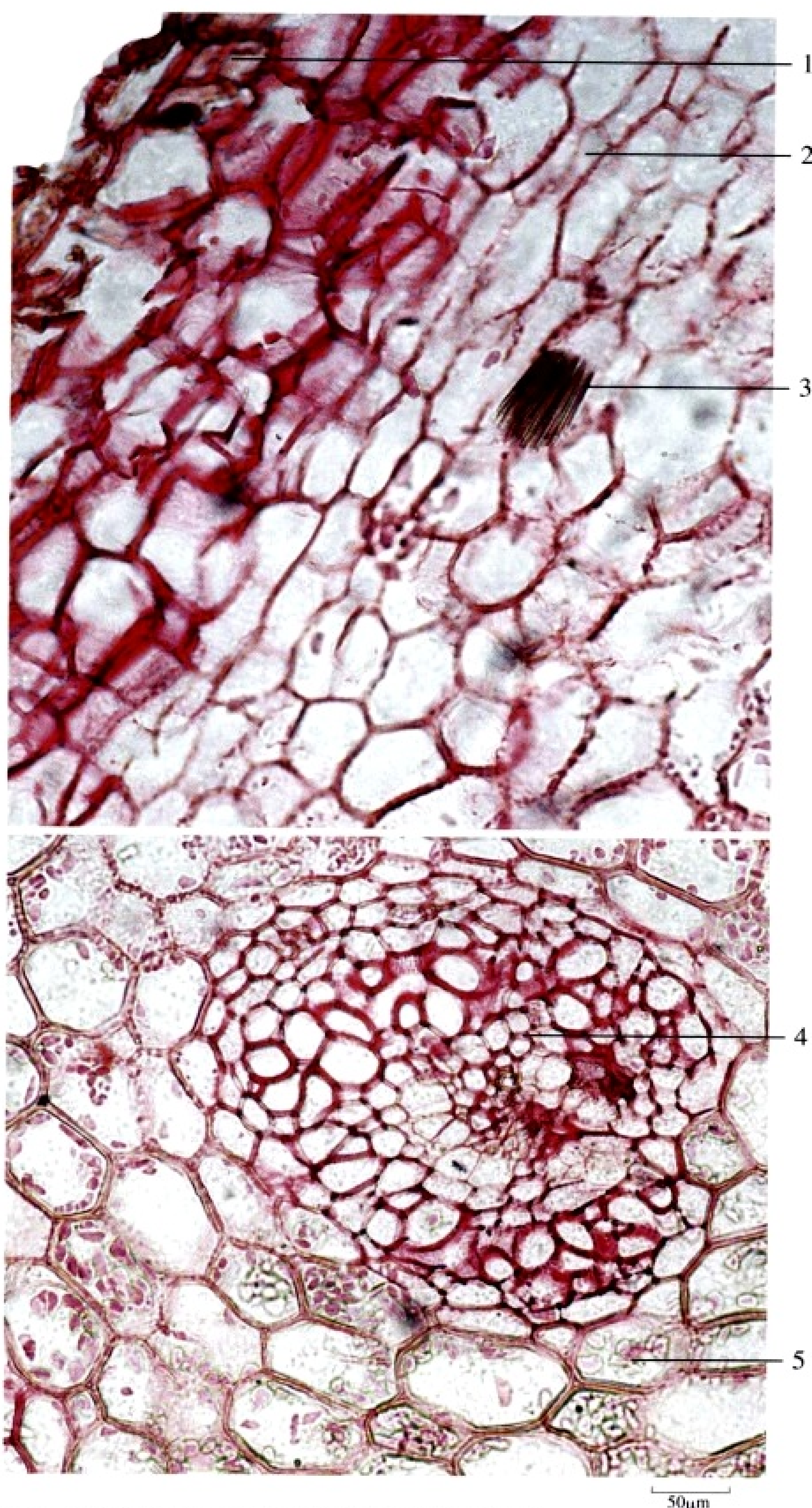


图1 粉萆薢（*Dioscorea hypoglauca* 根茎）横切面

[Fig1 Transverse section of rhizome from *Dioscorea hypoglauca*]

1. 木栓化细胞（Suberized cells） 2. 皮层（Cortex） 3. 草酸钙针晶束（Raphides of calcium oxalate） 4. 周木型维管束（Amphivasal vascular bundles） 5. 淀粉粒（Starch granules）

本品为薯蓣科植物粉背薯蓣 *Dioscorea hypoglauca* Palibin 的干燥根茎。

[显微特征] 本品横切面：外层为多列木栓化细胞。皮层较窄，细胞多切向延长，壁略增厚，木化壁纹孔明显。黏液细胞散在，内含草酸钙针晶束。中柱散生外韧型维管束及周木型维管束。薄壁细胞壁略增厚，具纹孔，细胞中含淀粉粒。（图1、2）

Transverse section: Outer part consisting of several layers of suberized cells. Cortex narrow, cells tangentially elongated, walls slightly thickened, the lignified walls showing distinct pits.Mucilage cells scattered, containing raphides of calcium oxalate. Collateral and amphivasal vascular bundles scattered in stele, parenchymatous cells with slightly thickened and pitted walls, containing starch granules. (Fig 1, 2)

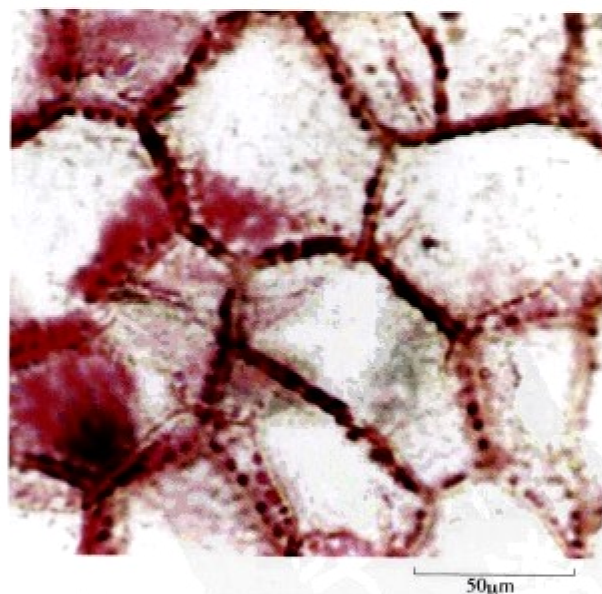


图2 示薄壁细胞具纹孔

[Fig2 Showing parenchymatous cells and pitted walls]

本品粉末：黄白色。淀粉粒单粒圆形、卵圆形或长椭圆形，直径5～32μm，长至40μm，脐点点状或裂缝状；复粒少数，多由2分粒组成。厚壁细胞众多，壁木化，孔沟明显，有的类似石细胞，多角形、梭形或类长方形，直径40～80μm，长至224μm。草酸钙针晶束长64～84μm。（图3）

Powder: Yellowish-white. Simple starch granules rounded, ovoid or long elliptical, 5 ~ 32 μm in diameter, up to 40 μm long, hilum pointed or cleft-like; compound granules less frequent, mostly composed of 2 components. Sclerenchymatous cells abundant, walls lignified, pits distinct, some similar to stone cells, polygonal, fusiform or subrectangular, 40 ~ 80 μm in diameter, up to 224 μm long. Raphides of calcium oxalate 64 ~ 84 μm long. (Fig 3)



图3 粉萆薢（*Dioscorea hypoglauca* 根茎）粉末

[Fig3 Powder of rhizome from *Dioscorea hypoglauca*]

1. 淀粉粒（Starch granules） 2. 厚壁细胞（Sclerenchymatous cells） 3. 草酸钙针晶束（Raphides of calcium oxalate）

粉　　葛

Fenge

RADIX PUERARIAE THOMSONII

本品为豆科植物甘葛藤*Pueraria thomsonii* Benth. 的干燥根。

[显微特征]　本品粉末： 黄白色。淀粉粒甚多，单粒少见，圆球形，直径8～15μm，脐点隐约可见；复粒多，由2～20多分粒组成。纤维多成束，壁厚，木化，周围细胞大多含草酸钙方晶，形成晶纤维，含晶细胞壁木化增厚。石细胞少见，类圆形或多角形，直径25～43μm。具缘纹孔导管较大，具缘纹孔椭圆形，排列极为紧密。（图1）

Powder: Yellowish-white. Starch granules numerous, simple granules infrequent, spheroidal, 8 ~ 15 μm in diameter, hilum indistinctly visible; compound granules numerous, of 2 ~ 20 or more components. Fibres mostly in bundles, walls thickened and lignified, surrounded by cells mostly containing prisms of calcium oxalate, forming crystal fibres; crystal cells with lignified and thickened walls. Stone cells infrequently visible, subrounded or polygonal, 25 ~ 43 μm in diameter. Bordered pitted vessels relatively large, bordered pits elliptical, very densely arranged. （Fig 1）

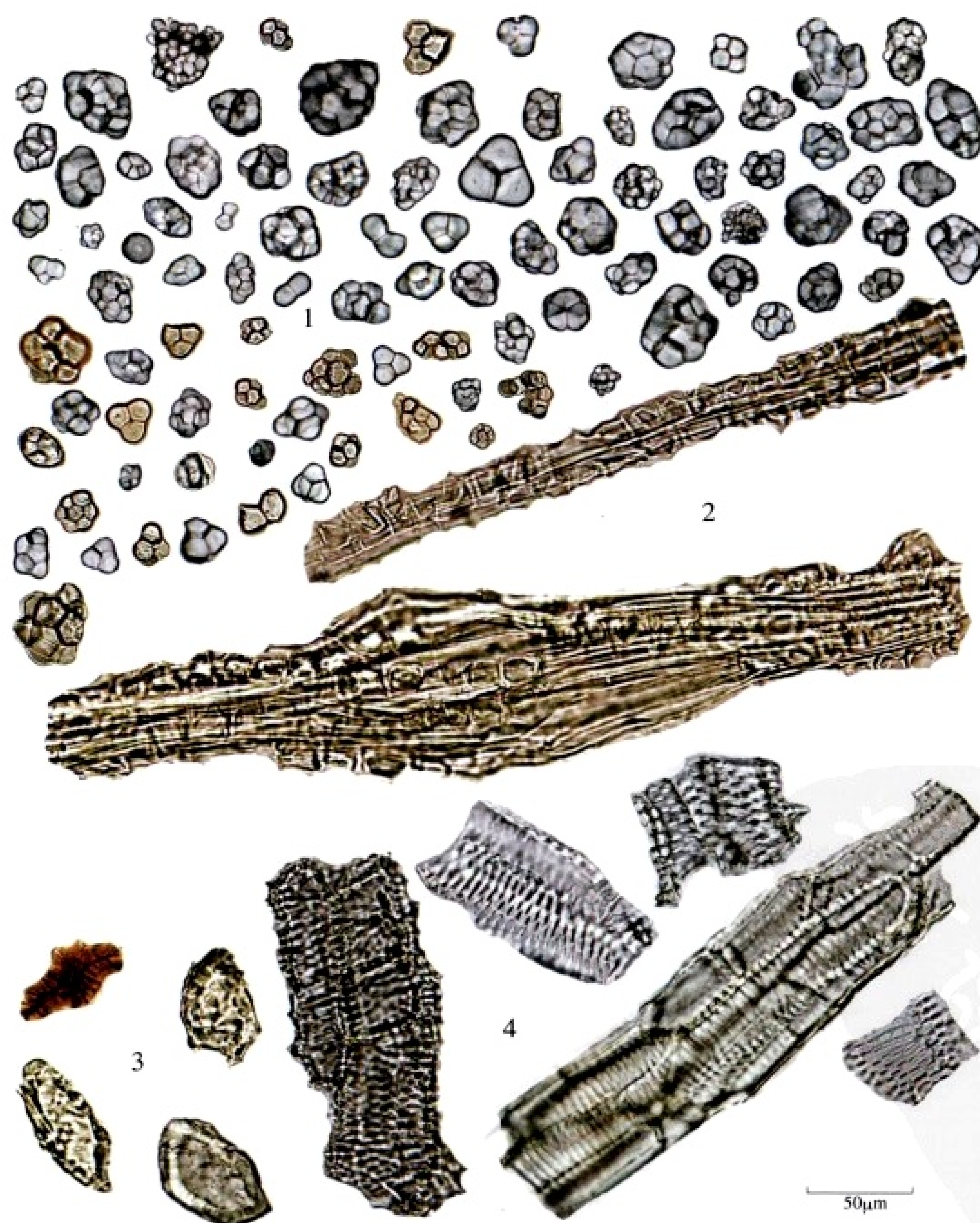


图1　粉葛（*Pueraria thomsonii* 根）粉末

[Fig1　Powder of root from *Pueraria thomsonii*]

1. 淀粉粒（Starch granules）　2. 晶纤维（Crystal fibres）　3. 石细胞（Stone cells）　4. 导管（Vessels）

益 母 草

Yimucao

HERBA LEONURI

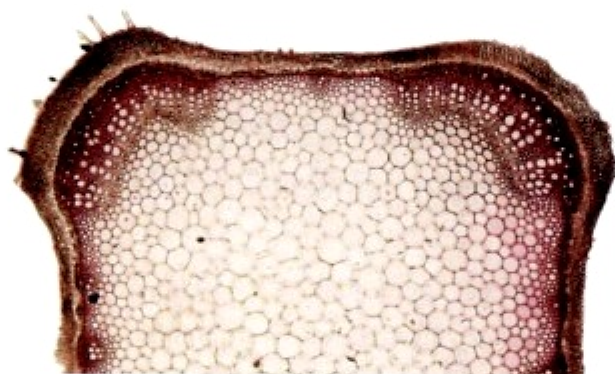


图1　益母草（*Leonurus japonicus* 茎）横切面

[Fig1　Transverse section of stem from *Leonurus japonicus*]

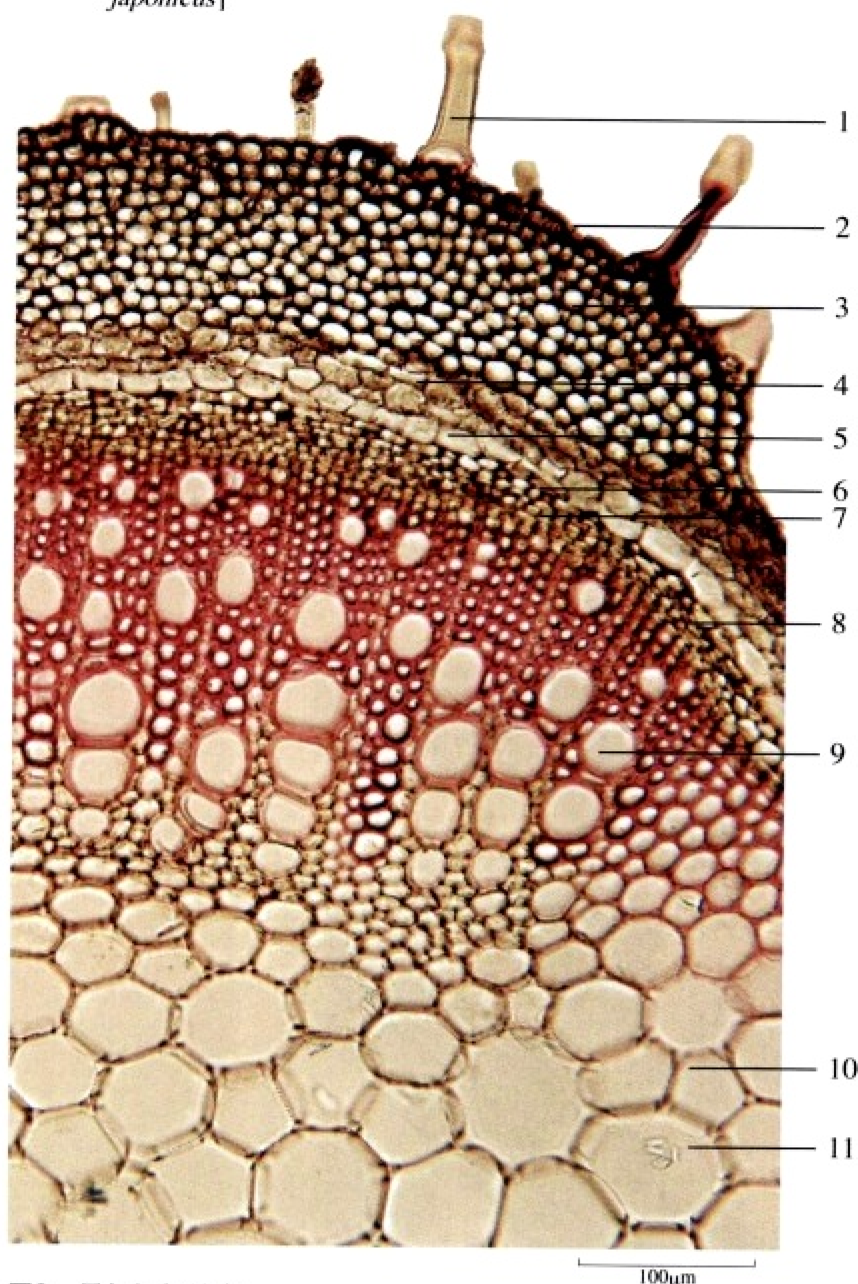


图2　局部组织放大

[Fig2　Partial tissue maynified

1. 茸毛(Pubescence)　2. 表皮(Epidermis)　3. 厚角细胞(Collenchymatous cells)　4. 皮层（Cortex）　5. 内皮层（Endodermis）　6. 中柱鞘纤维束（Pericyclic fibre bundles）　7. 韧皮部（Phloem）　8. 形成层（Cambium）　9. 木质部（Xylem）　10. 髓（Pith）　11. 草酸钙针晶（Needle crystals of calcium oxalate）

本品为唇形科植物益母草*Leonurus japonicus* Houtt. 的新鲜或干燥地上部分。

[显微特征]　本品茎的横切面：表皮细胞外被角质层，有茸毛；腺鳞头部4、6或8细胞，柄单细胞；非腺毛1～4细胞。下皮厚角细胞在棱角处较多。皮层为数列薄壁细胞；内皮层明显。中柱鞘纤维束微木化。韧皮部较窄。木质部在棱角处较发达。髓部薄壁细胞较大。薄壁细胞含细小草酸钙针晶及小方晶。鲜品近表皮部分皮层薄壁细胞含叶绿体。（图1～3）

Transverse section of stem: Epidermal cells covered with cuticle outside, pubescent, glandular scales with 4, 6 or 8-celled heads and unicellular stalks; non-glandular hairs 1～4 celled. Hypodermal collenchymatous cells abundant in the angular region. Cortex consisting of several layers of parenchymatous cells; endodermis distinct. Pericyclic fibre bundles slightly lignified. Phloem relatively narrow. Xylem well developed in the angular region. In pith parenchymatous cells relatively large. Parenchymatous cells containing minute needle crystals and small prisms of calcium oxalate. Cortex parenchymatous cells near epidermis containing chromoplasts in fresh herb.（Fig 1～3）

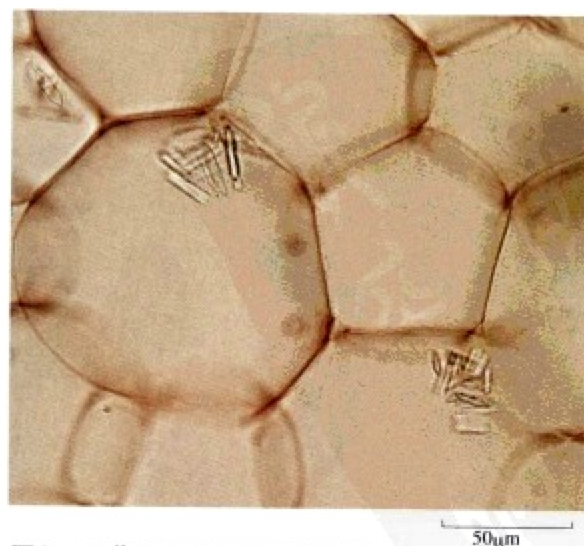


图3　示薄壁细胞含草酸钙针晶

[Fig3　Showing parenchymatous cells containing needle crystals of calcium oxalate]

益　智

Yizhi

FRUCTUS ALPINIAE OXYPHYLLAE

本品为姜科植物益智*Alpinia oxyphylla* Miq. 的干燥成熟果实。

[显微特征]　本品种子横切面：假种皮薄壁细胞有时残存。种皮表皮细胞类圆形、类方形或长方形，略径向延长，壁较厚；下皮细胞为1列薄壁细胞，含黄棕色物；油细胞1列，类方形或长方形，含黄色油滴；色素层为数列黄棕色细胞，其间散有较大的类圆形油细胞1～3列，含黄色油滴；内种皮为1列栅状厚壁细胞，黄棕色或红棕色，内壁与侧壁极厚，胞腔小，内含硅质块。外胚乳细胞充满细小淀粉粒集结成的淀粉团。内胚乳细胞含糊粉粒及脂肪油滴。（图1）

Transverse section of seed: Parenchymatous cells of aril sometimes remained. Epidermal cells of testa subrounded, subsquare or rectangular, slightly radially elongated, relatively thick-walled. Hypodermis consisting of 1 layer of parenchymatous cells, containing yellowish-brown contents. Oil cells in 1 layer, subsquare or rectangular, containing yellow oil droplets; pigment layer consisting of several layers of yellowish-brown cells, scattered with 1 ~ 3 layers of relatively large subrounded oil cells containing yellow oil droplets. Endotesta consisting of 1 layer of palisade sclerenchyma cells, yellowish-brown or reddish-brown, the inner and lateral walls extremely thick, lumina small, each containing a silica body. Perisperm cells filled with starch granules. Endosperm cells contain aleurone grains and fatty oil droplets.（Fig 1）

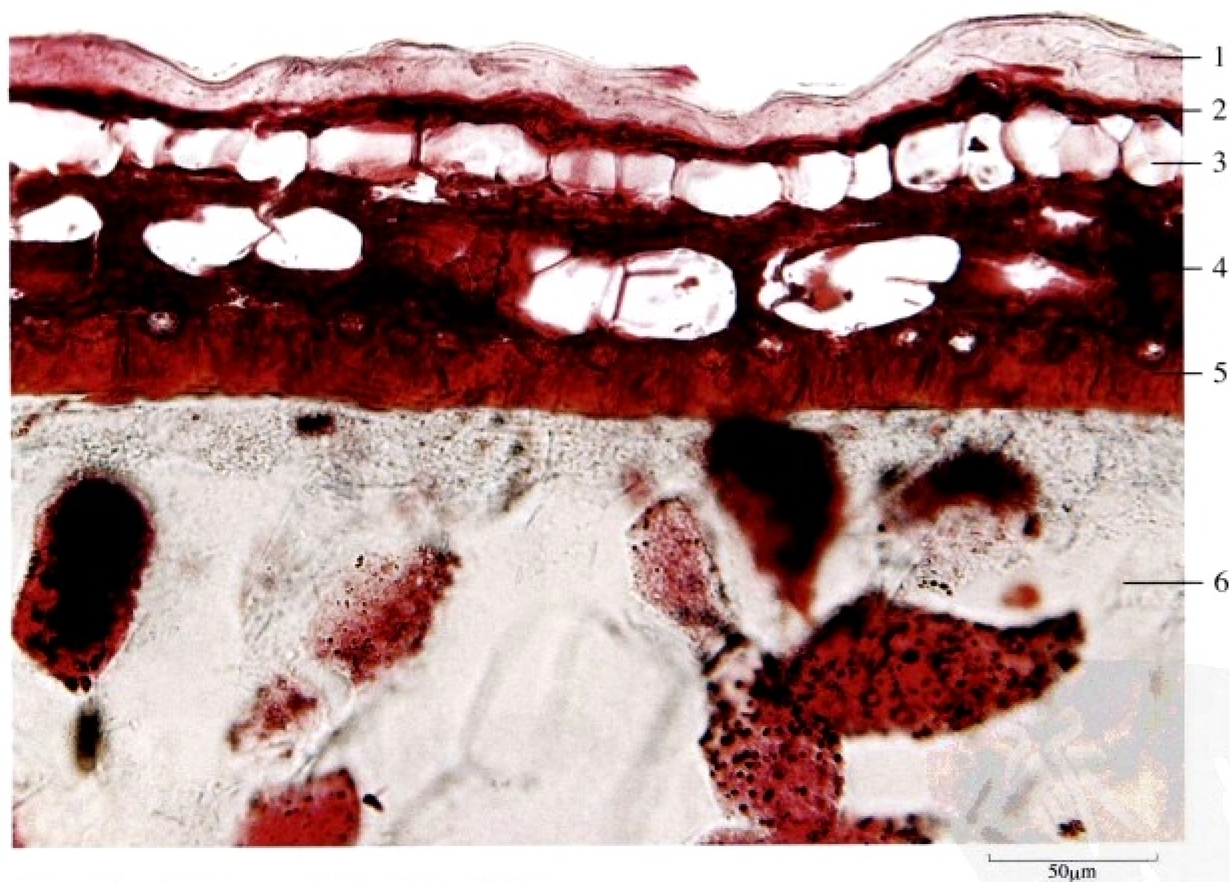


图1　益智（*Alpinia oxyphylla* 种子）横切面

[Fig1　Transverse section of seed from *Alpinia oxyphylla*]

1. 种皮表皮细胞（Epidermal cells of testa）　2. 下皮细胞（Hypodermal cells）　3. 油细胞层（Oil cells layer）　4. 色素层（Pigment layer）　5. 内种皮栅状厚壁细胞（Palisade sclerenchymatous cells of endotesta）　6. 外胚乳细胞（Perisperm cells）

本品粉末：黄棕色。种皮表皮细胞表面观呈长条形，直径约至29μm，壁稍厚，常与下皮细胞上下层垂直排列。色素层细胞皱缩，界限不清楚，含红棕色或深棕色物，常碎裂成不规则色素块。油细胞类方形、长方形，或散列于色素层细胞间。内种皮厚壁细胞黄棕色或棕色，表面观多角形，壁厚，非木化，胞腔内含硅质块；断面观细胞1列，栅状，内壁及侧壁极厚，胞腔偏外侧，内含硅质块。外胚乳细胞充满细小淀粉粒集结成的淀粉团。内胚乳细胞含糊粉粒及脂肪油滴。(图2)

Powder: Yellowish-brown. Epidermal cells of testa strip-shaped in surface view, up to 29 μm in diameter, walls slightly thickened, often vertically arranged with hypodermal cells. Cells of pigment layer wrinkled, indistinctly bordered, containing reddish-brown and dark brown contents, most cells broken to irregular pigment fragments. Oil cells subsquare, rectangular or scattered among the cells of pigment layer. Sclerenchymatous cells of endotesta yellowish-brown or brown, polygonal in surface view, walls thickened and unlignified, containing silica bodies; in section view, palisade-like cells in 1 layer, the inner and lateral walls extremely thickened, lumina outwards eccentric, containing silica bodies. Perisperm cells filled with starch masses, aggregated from fine starch granules. Endosperm cells containing aleurone grains and fatty oil droplets. (Fig 2)

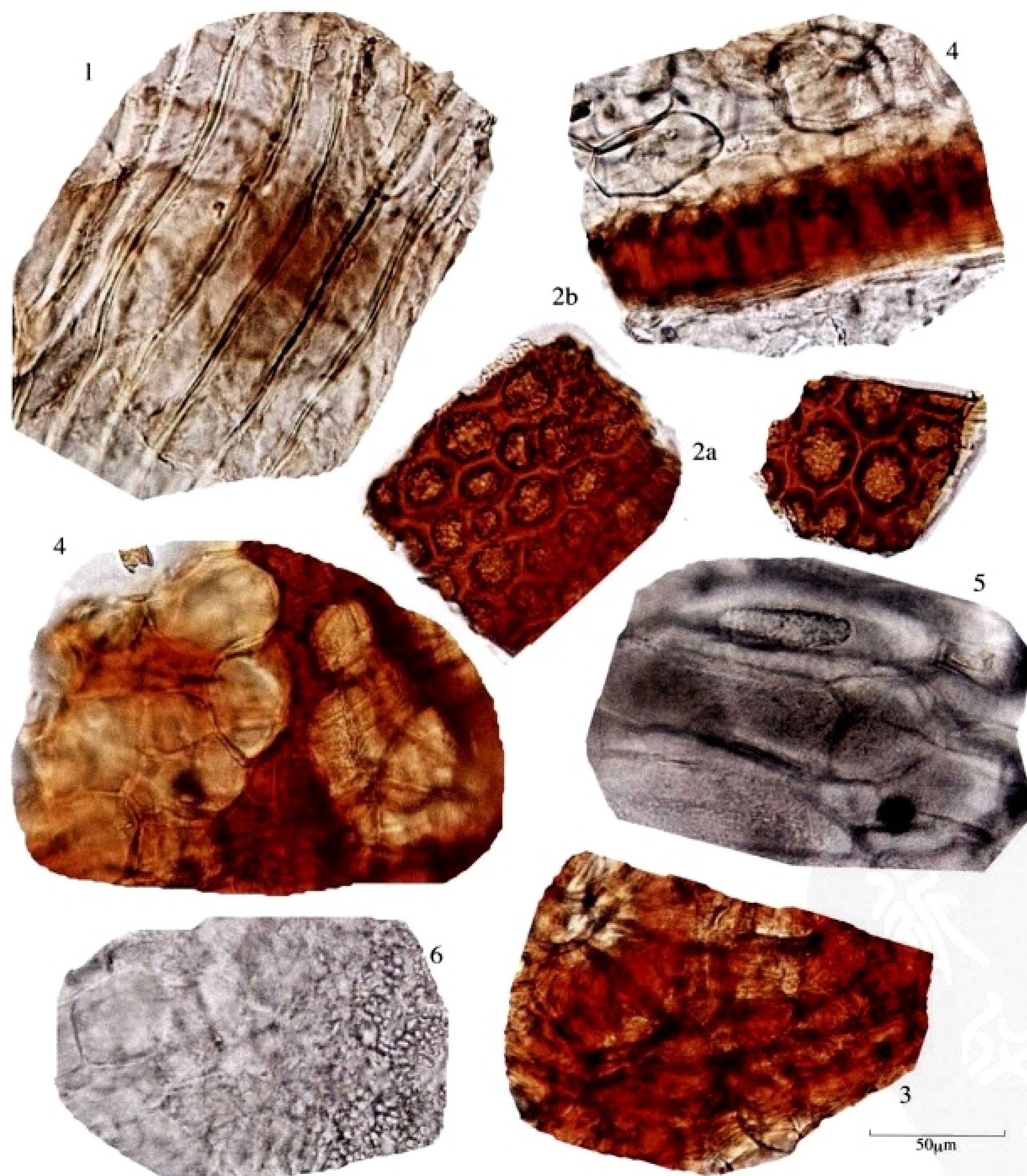


图2 益智（*Alpinia oxyphylla* 种子）粉末

[Fig2 Powder of seed from *Alpinia oxyphylla*]

1. 种皮表皮细胞（Epidermal cells of testa） 2. 内种皮厚壁细胞[Sclerenchymatous cells of endotesta（a.表面观Surface view b.断面观Section view）] 3. 色素层细胞（Pigment layer cells） 4. 油细胞（Oil cells） 5. 外胚乳细胞（Perisperm cells） 6. 内胚乳细胞（Endosperm cells）

浙贝母

Zhebeimu

BULBUS FRITILLARIAE THUNBERGII

本品为百合科植物浙贝母*Fritillaria thunbergii* Miq. 的干燥鳞茎。

[显微特征]　本品粉末：淡黄白色。淀粉粒甚多，单粒卵形、广卵形或椭圆形，直径6～56μm，层纹不明显。表皮细胞类多角形或长方形，垂周壁连珠状增厚；气孔少见，副卫细胞4～5个。草酸钙结晶少见，细小，多呈颗粒状，有的呈梭形、方形或细杆状。导管多为螺纹，直径至18μm。（图1）

Powder: Pale yellowish-white. Starch granules numerous, simple granules ovoid, broad-ovoid or elliptical, 6～56 μm in diameter, striations indistinct. Epidermis cells subpolygonal or rectangular, anticlinal walls beaded-thickened; stomata less visible, with 4～5 subsidiary cells. Crystals of calcium oxalate less visible, minute, mostly granular, some in fusiform, square or thin bacilliform. Vessels mostly spiral, up to 18 μm in diameter.　(Fig 1)

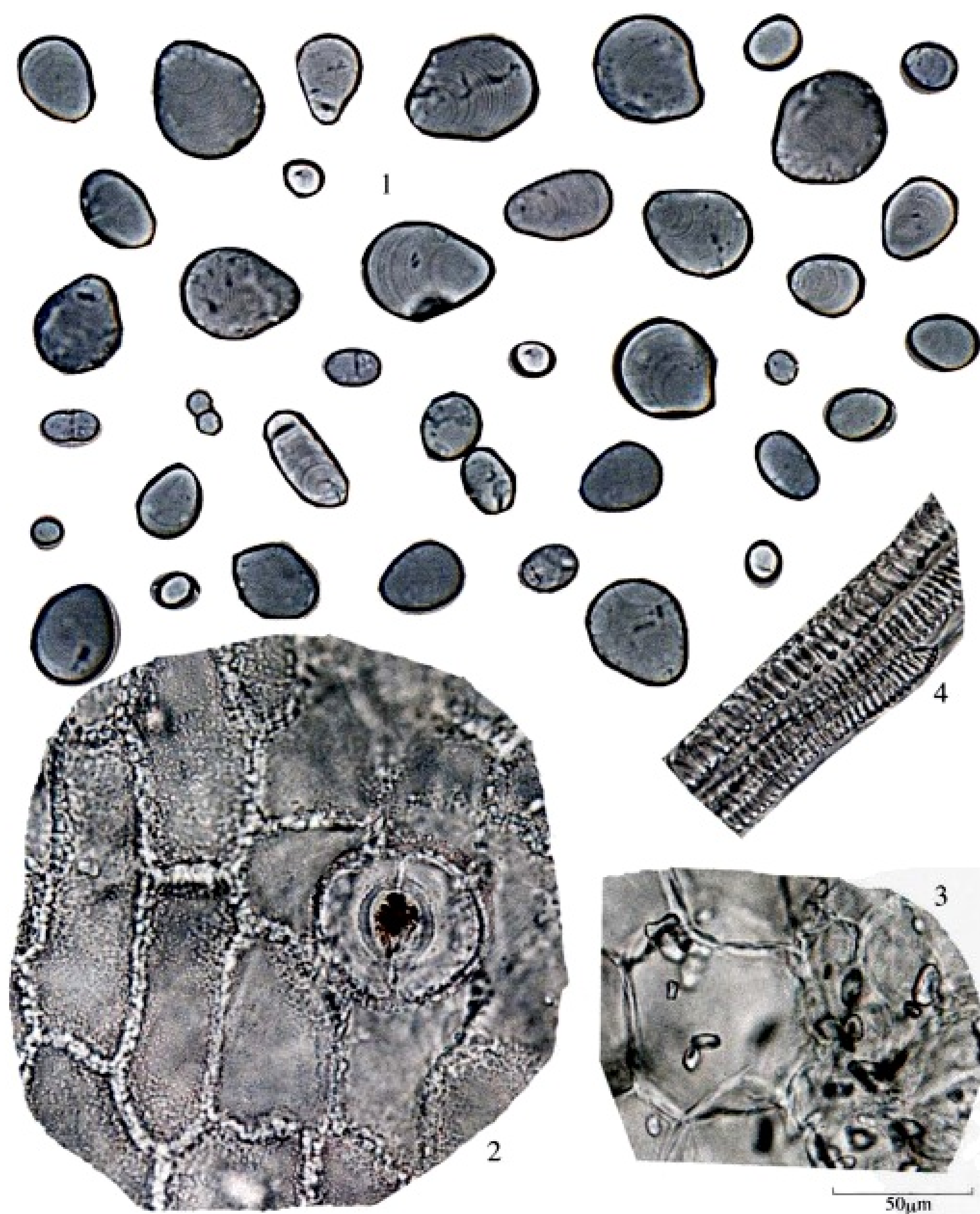


图1　浙贝母（*Fritillaria thunbergii* 鳞茎）粉末

[Fig1　Powder of bulb from *Fritillaria thunbergii*]

1. 淀粉粒（Starch granules）　2. 表皮细胞（Epidermal cells）　3. 草酸钙结晶（Crystals of calcium oxalate）　4. 导管（Vessels）

海 金 沙

Haijinsha

SPORA LYGODII

本品为海金沙科植物海金沙*Lygodium japonicum*（Thunb.）Sw. 的干燥成熟孢子。

[显微特征]　本品粉末：棕黄色或浅棕黄色。孢子为四面体形、三角状圆锥形，顶面观三面锥形，可见三叉状裂隙，侧面观类三角形，底面观圆三角形，直径60～85μm，周壁有颗粒状雕纹。（图1）

Powder: Brownish-yellow or pale brownish-yellow. Spores tetrahedral or triangular conical; triphase conical in top view, Y-shaped fissures visible, subtriangular in lateral view, round-triangular in bottom view, 60～85 μm in diameter, with granular sculptures in outer walls. （Fig 1）



图1　海金沙（*Lygodium japonicum* 孢子）粉末

[Fig1　Powder of spore from *Lygodium japonicum*]

1. 孢子的顶面观（Top view of spores）　2. 孢子的侧面观（Lateral view of spores）　3. 孢子的底面观（Bottom view of spores）

海　螵　蛸

Haipiaoxiao

ENDOCONCHA SEPIAE

本品为乌贼科动物无针乌贼*Sepiella maindroni* de Rochebrune或金乌贼*Sepia esculenta* Hoyle的干燥内壳。

[显微特征]　**本品粉末：**类白色。多数为不规则透明薄片，有的具细条纹；另有不规则碎块，表面显网状或点状纹理。（图1）

Powder: Whitish. Irregular transparent thin slices abundant, some with fine striations; some in irregular broken pieces, with reticulate or dotted striations on the surface. （Fig 1）



图1　海螵蛸（*Sepia esculenta* 内壳）粉末

[Fig1　Powder of internal shell from *Sepia esculenta*]

1. 不规则透明薄片（Irregular transparent thin slices）　2. 不规则碎块（Irregular broken pieces）

通　草

Tongcao

MEDULLA TETRAPANACIS

本品为五加科植物通脱木*Tetrapanax papyriferus*（Hook.）K. Koch 的干燥茎髓。

[显微特征]　**本品横切面**：全部为薄壁细胞，椭圆形、类圆形或近多角形，外侧的细胞较小，纹孔明显，有的细胞含草酸钙簇晶，直径15～64 μm。（图1）

Transverse section: All of elliptic, subrounded or subpolygonal parenchymatous cells, outer cells relatively small, pits obvious. Some parenchymatous cells containing clusters of calcium oxalate, 15～64 μm in diameter.（Fig 1）

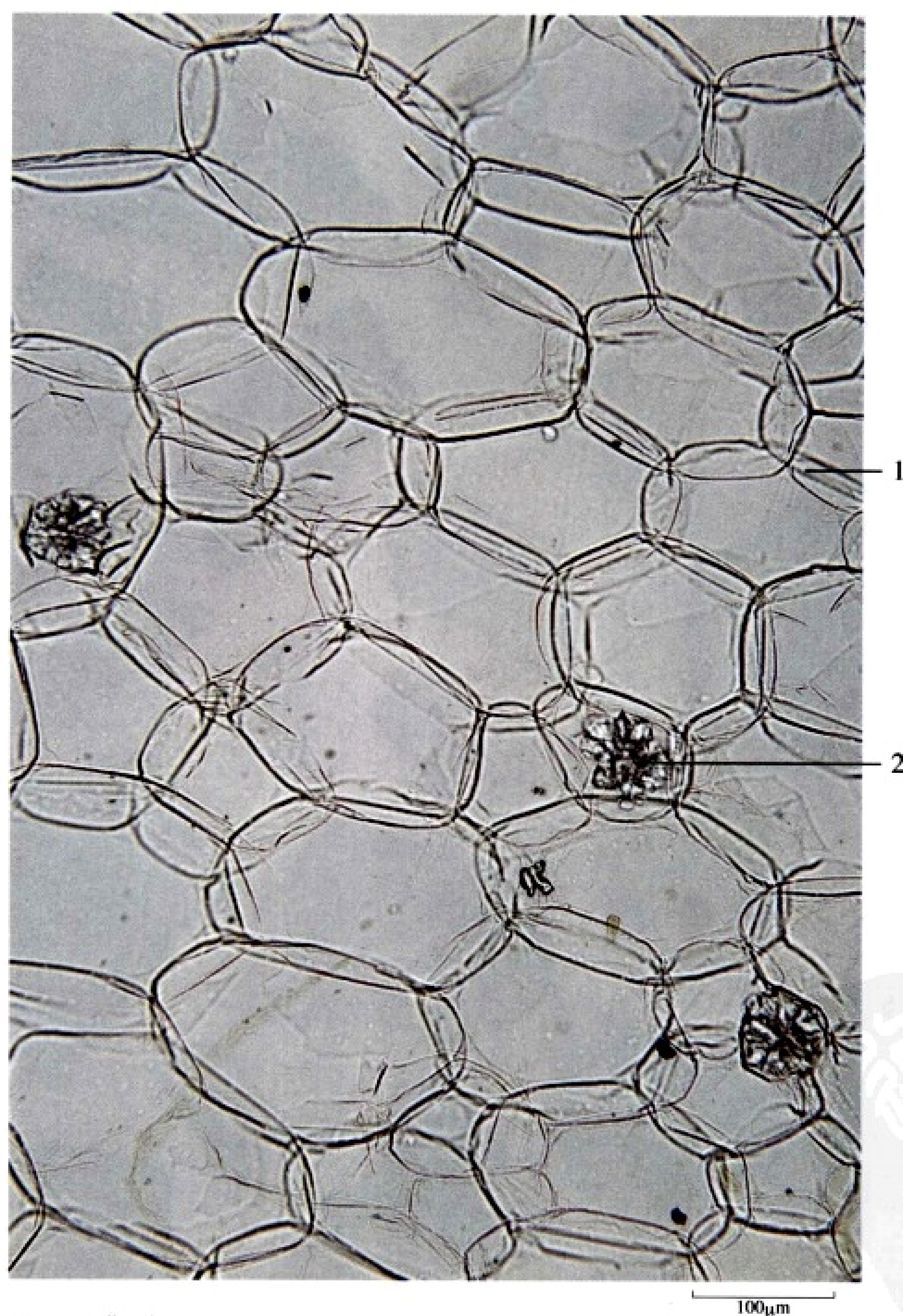


图1　通草（*Tetrapanax papyriferus* 茎髓）横切面

[Fig1　Transverse section of stem pith from *Tetrapanax papyriferus*]

1. 薄壁细胞（Parenchymatous cells）　2. 草酸钙簇晶（Clusters of calcium oxalate）

桑　叶

Sangye

FOLIUM MORI

本品为桑科植物桑*Morus alba* L. 的干燥叶。

[显微特征]　本品粉末：黄绿色或黄棕色。上表皮有含钟乳体的大型晶细胞，钟乳体直径47～77μm。下表皮气孔不定式，副卫细胞4～6个。非腺毛单细胞，长50～230μm。草酸钙簇晶直径5～16μm，偶见方晶。（图1）

Powder: Yellowish-green or yellowish-brown. Large crystal cells occurring in the upper epidermis containing cystoliths, 47～77 μm in diameter. Stomata in lower epidermis anomocytic, with 4～6 subsidiary cells. Non-glandular hairs unicellular, 50～230 μm long. Clusters of calcium oxalate 5～16 μm in diameter; prisms occasionally visible. (Fig 1)



图1　桑叶（*Morus alba* 叶）粉末

[Fig1　Powder of leaf from *Morus alba*]

1. 上表皮细胞及钟乳体[Upper epidermal cells and cystolith　(a.表面观Surface view　b.侧面观Lateral view)]　2. 下表皮细胞及气孔（Lower epidermis cells and stomata）　3. 非腺毛（Non-glandular hairs）　4. 草酸钙簇晶（Clusters of calcium oxalate）　5. 草酸钙方晶（Prisms of calcium oxalate）

桑 白 皮

Sangbaipi

CORTEX MORI

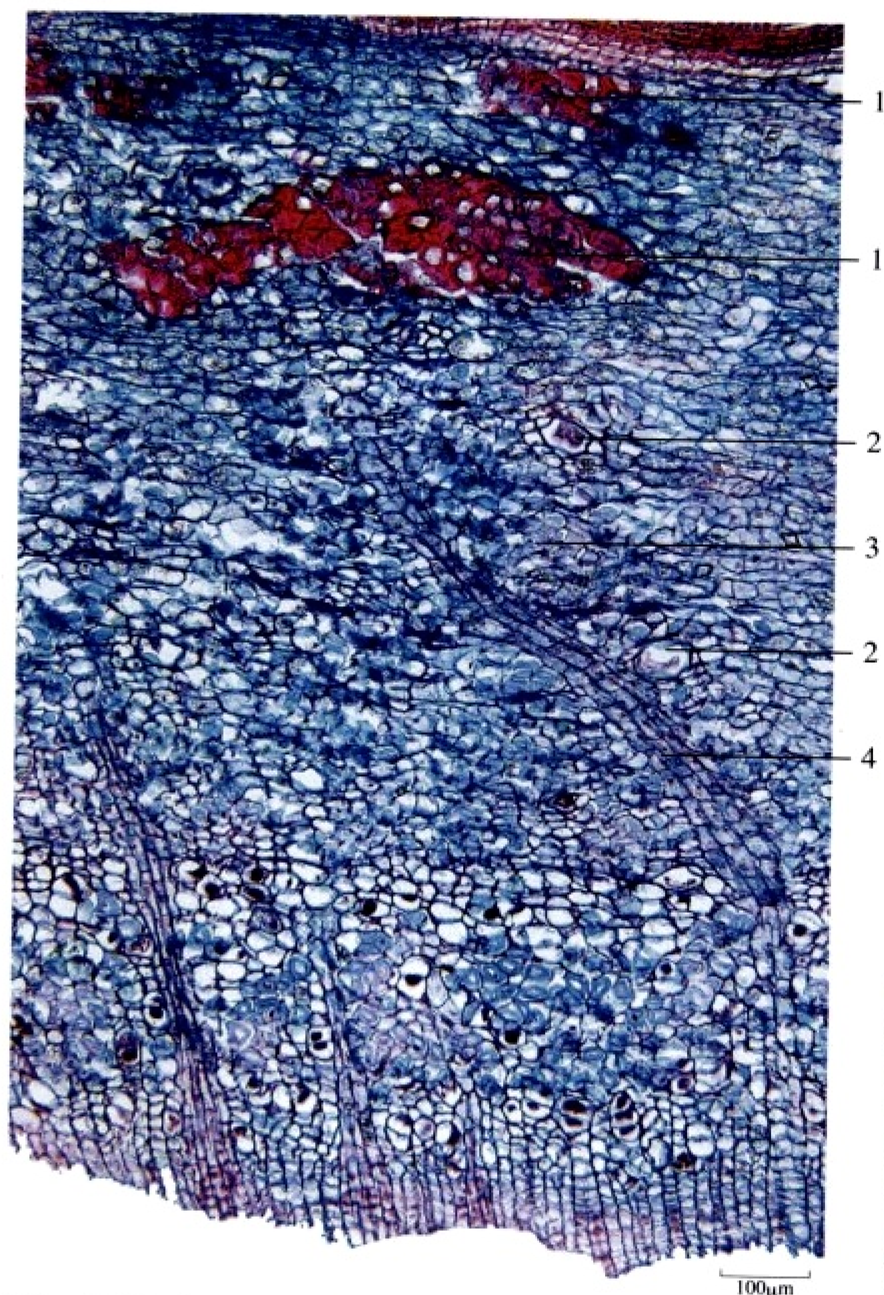


图1 桑白皮（*Morus alba* 根皮）横切面

[Fig1 Transverse section of root bark from *Morus alba*]

1. 夹有石细胞的厚壁细胞群（The groups of sclerenchymatous cells embeded with stone cells） 2. 乳管（Laticiferous tubes） 3. 纤维束（Fibre bundles） 4. 韧皮射线（Phloem rays）

本品为桑科植物桑*Morus alba* L. 的干燥根皮。

[显微特征] **本品横切面**：韧皮射线宽2～6列细胞；散有乳管；纤维单个散在或成束，非木化或微木化；薄壁细胞含淀粉粒，有的细胞含草酸钙方晶。较老的根皮中，散在夹有石细胞的厚壁细胞群，胞腔大多含方晶。（图1～3）

Transverse section: Phloem rays 2～6 cells wide; laticiferous tubes scattered; fibres scattered singly or in bundles, unlignified or slightly lignified; parenchymatous cells containing starch granules, some containing prisms of calcium oxalate. Groups of sclerenchymatous cells embeded with stone cells scattered in the aged root bark, cells mostly containing prisms.（Fig 1～3）

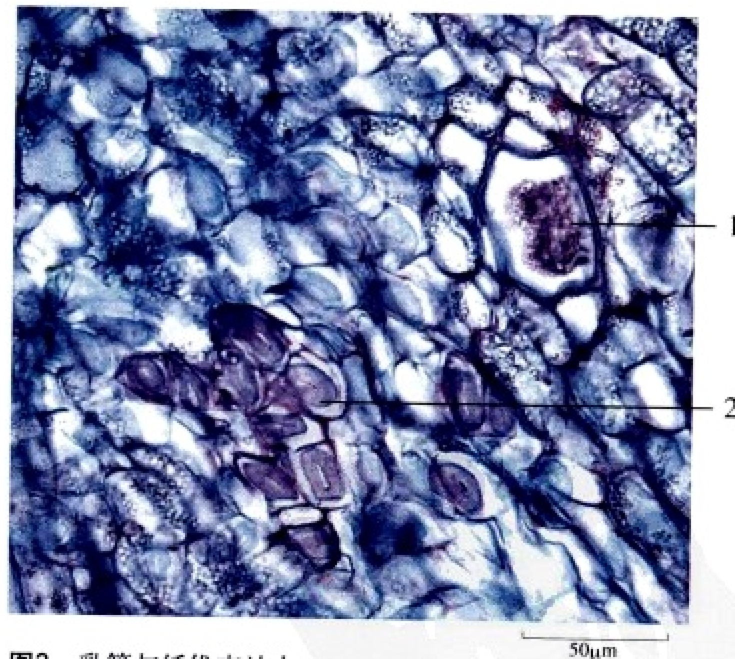


图3 乳管与纤维束放大

[Fig3 Laticiferous tubes and fibre bundles magnified]

1. 乳管（Laticiferous tubes） 2. 纤维束（Fibre bundles）

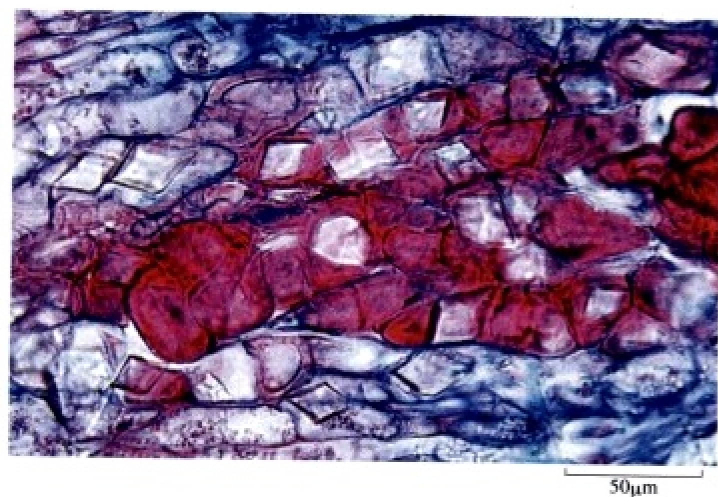


图2 示夹有石细胞的含晶厚壁细胞群

[Fig2 Showing the groups of sclerenchymatous cells embeded with stone cells containing prisms of calcium oxalate]

本品粉末：淡灰黄色。纤维甚多，多碎断，直径13～26μm，壁厚，非木化至微木化。草酸钙方晶直径11～32μm。石细胞类圆形、类方形或形状不规则，直径22～52μm，壁较厚或极厚，纹孔及孔沟明显，胞腔内有的含方晶。另有含晶厚壁细胞。淀粉粒甚多，单粒类圆形，直径4～16μm；复粒由2～8分粒组成。（图4）

Powder: Pale greyish-yellow. Fibres numerous, mostly broken, 13 ~ 26 μm in diameter, walls thickened, unlignified to slightly lignified. Prisms of calcium oxalate 11 ~ 32 μm in diameter. Stone cells subrounded, subsquare or irregular, 22 ~ 52 μm in diameter, walls relatively thickened or extremely thickened, with distinct pits and pit canals, some containing prisms. Sclerenchymatous cells containing crystals present. Starch granules numerous, simple granules subrounded, 4 ~ 16 μm in diameter; compound granules of 2 ~ 8 components. (Fig 4)

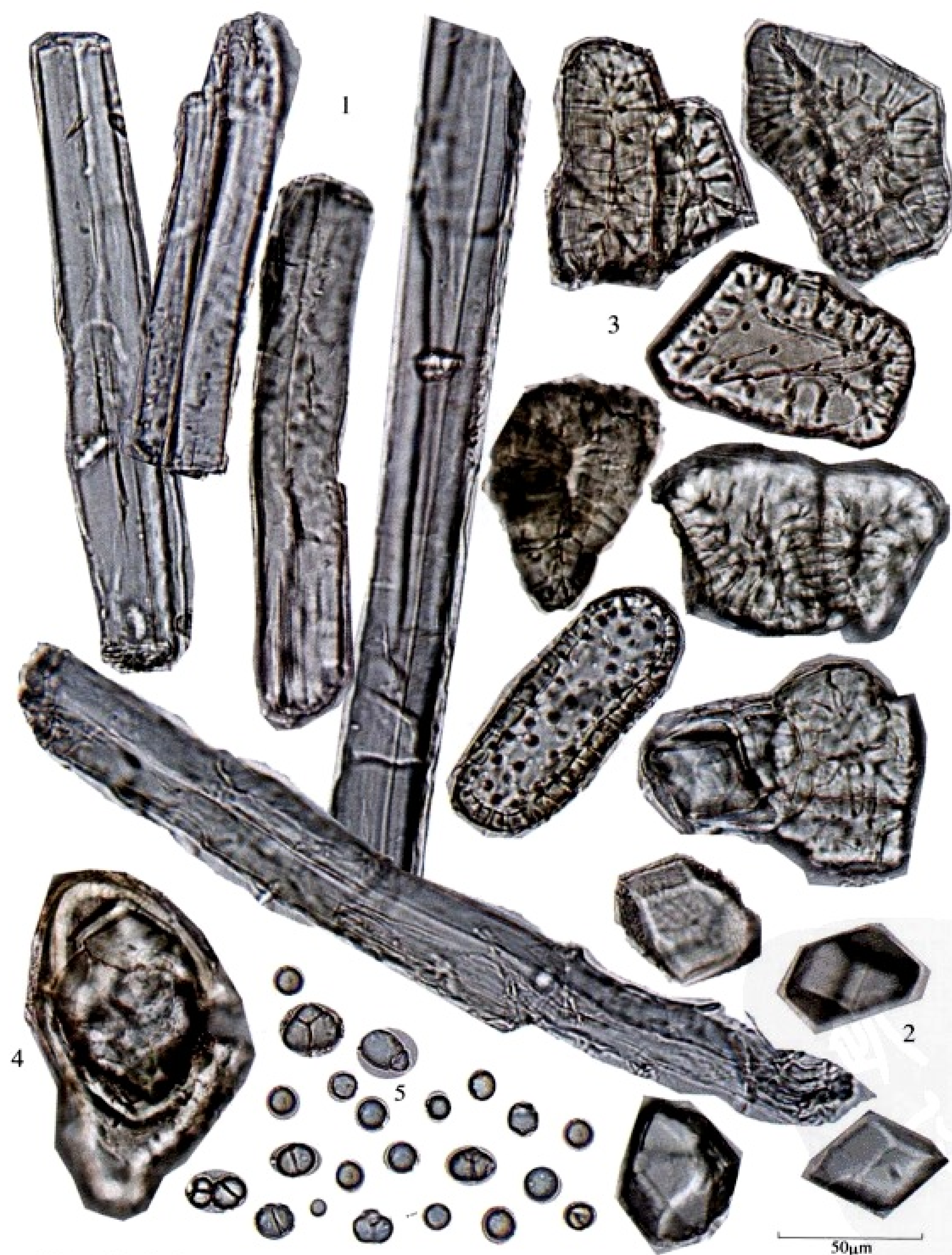


图4 桑白皮（*Morus alba* 根皮）粉末

[Fig4 Powder of root bark from *Morus alba*]

1. 纤维（Fibres） 2. 草酸钙方晶（Prisrns of calcium oxalate） 3. 石细胞（Stone cells）
4. 含晶厚壁细胞（Sclerenchymatous cells containing crystals） 5. 淀粉粒（Starch granules）

桑　枝

Sangzhi

RAMULUS MORI

本品为桑科植物桑*Morus alba* L. 的干燥嫩枝。

[显微特征]　**本品粉末**：灰黄色。纤维较多，成束或散在，淡黄色或无色，略弯曲，直径10～30μm，壁厚5～15μm，弯曲处呈皱襞，胞腔甚细。石细胞淡黄色，呈类圆形、类方形，直径15～40μm，壁厚5～20μm，胞腔小。含晶厚壁细胞成群或散在，形状、大小与石细胞近似，胞腔内含草酸钙方晶1～2个。草酸钙方晶存在于厚壁细胞中或散在，直径5～20μm。木栓细胞表面观呈多角形，垂周壁平直或弯曲。(图1)

Powder: Pale greyish-yellow. Fibres numerous, scattered singly or in bundles, pale yellow or colourless, slightly sinuous, 10～30 μm in diameter, walls 5～15 μm thick, plica-shaped at sinuosities, lumina fine. Stone cells pale yellow, subrounded or subsquare, 15～40 μm in diameter, walls 5～20 μm thick, lumina small. Sclerenchymatous cells in groups or scattered singly, similar to the stone cells in the shape and size, containing 1～2 prisms of calcium oxalate. Prisms occurring in the sclerenchymatous cells or scattered, 5～20 μm in diameter. Cork cells polygonal in surface view, anticlinal walls straight or curved. (Fig 1)



图1　桑枝（*Morus alba* 嫩枝）粉末

[Fig1　Powder of young branch from *Morus alba*]

1. 纤维（Fibres）　2. 石细胞（Stone cells）　3. 含晶厚壁细胞（Sclerenchymatous cells containing prisms of calcium oxalate）　4. 草酸钙方晶（Prisms of calcium oxalate）　5. 木栓细胞（Cork cells）

桑寄生

Sangjisheng

HERBA TAXILLI

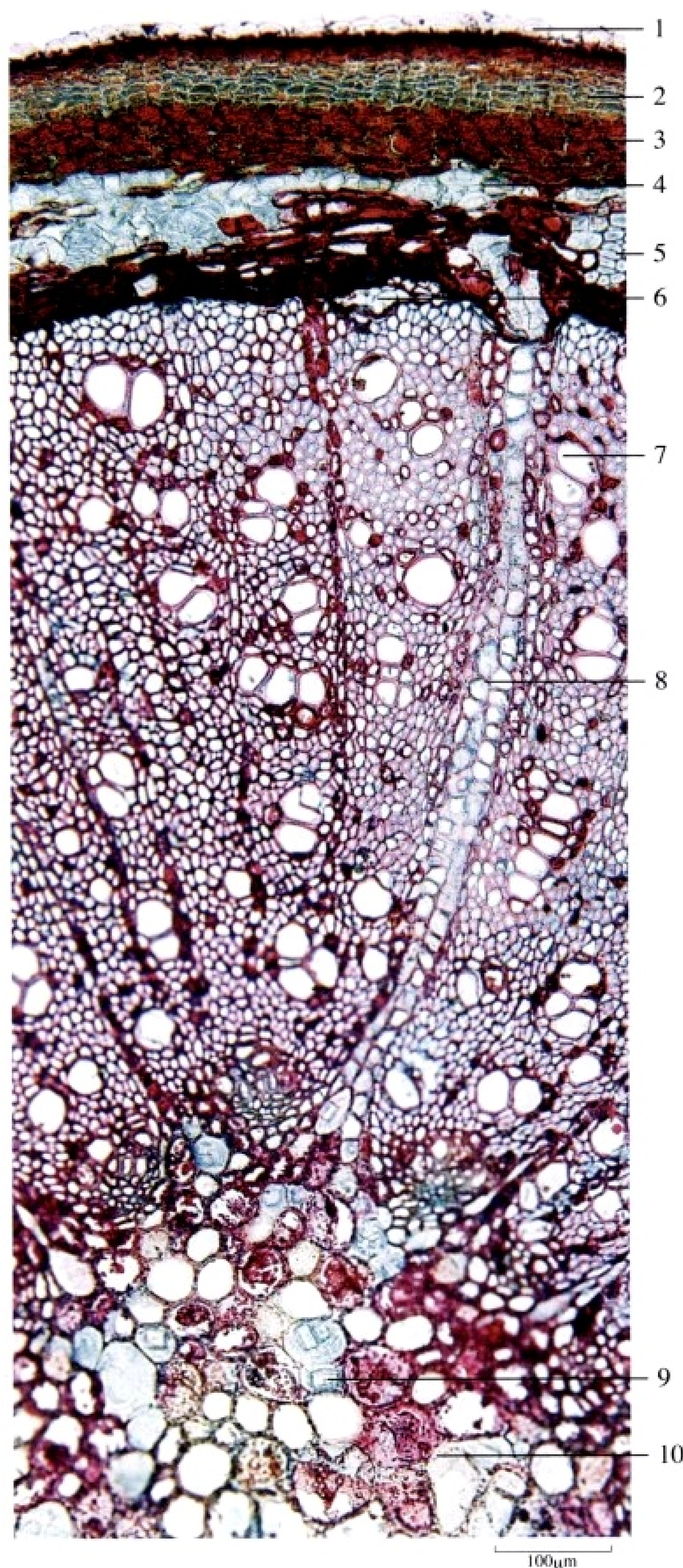


图1　桑寄生（*Taxillus chinensis* 茎）横切面

[Fig1　Transverse section of stem from *Taxillus chinensis*]

1. 表皮（Epidermis）　2. 木栓层（Cork）　3. 皮层（Cortex）　4. 中柱鞘部位石细胞群（Groups of stone cells in pericycle region）　5. 纤维束（Fibre bundles）　6. 韧皮部（Phloem）7. 木质部（Xylem）　8. 射线（Rays）　9. 草酸钙方晶（Prisms of calcium oxalate）　10. 髓（Pith）

本品为桑寄生科植物桑寄生*Taxillus chinensis*（DC.）Danser的干燥带叶茎枝。

[显微特征]　本品茎的横切面：表皮细胞有时残存。木栓层为10余列细胞，有的含棕色物。皮层窄，老茎有石细胞群，薄壁细胞含棕色物。中柱鞘部位有石细胞群及纤维束，断续环列。韧皮部甚窄，射线散有石细胞。束内形成层明显。木质部射线宽1～4列细胞，近髓部也可见石细胞；导管单个散列或2～3个相聚。髓部有石细胞群，薄壁细胞含棕色物。有的石细胞含草酸钙方晶或棕色物。（图1、2）

Transverse section of stem: Epidermal cells sometimes remained. Cork cells 10 or more layers, some containing brown contents. Cortex narrow, groups of stone cells occurring in older stem, parenchymatous cells containing brown contents. Groups of stone cells and fibre bundles existing in pericycle, arranged in an interrupted ring. Phloem extremely narrow, rays with scattered stone cells. Fascicular cambium distinct. Xylem rays 1～4 rows of cells, stone cells occurring near pith; vessels scattered singly or 2～3 aggregated in groups. Groups of stone cells occurring in pith and the parenchymatous cells containing brown contents. Some stone cells containing prisms of calcium oxalate or brown contents.（Fig 1, 2）

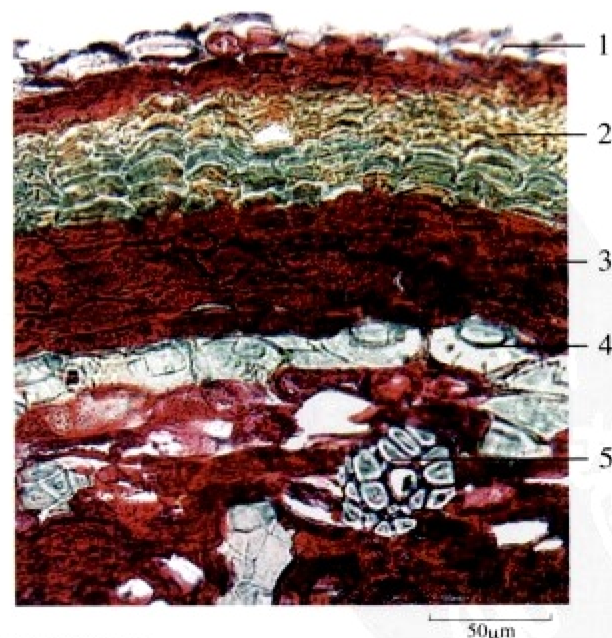


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 表皮（Epidermis）　2. 木栓层（Cork）　3. 皮层（Cortex）　4. 含晶石细胞（Stone cells containing prisms of calcium oxalate）　5. 纤维束（Fibre bundles）

本品粉末：淡黄棕色。石细胞类方形、类圆形，偶有分枝，有的壁三面厚，一面薄，含草酸钙方晶。纤维成束，直径约17 μm。具缘纹孔、网纹及螺纹导管多见。星状毛分枝碎片少见。(图3)

Powder: Pale yellowish-brown. Stone cells subsquare, subrounded, occasionally branched, sometimes walls thickened on 3 sides and thin on one side, containing prisms of calcium oxalate. Fibres in bundles, about 17 μm in diameter. Bordered pitted, reticulated and spiral vessels frequently visible. Fragments of branched asteriate hairs rare. (Fig 3)



图3 桑寄生（*Taxillus chinensis* 带叶茎枝）粉末

[Fig3 Powder of stem from *Taxillus chinensis*]

1. 石细胞（Stone cells） 2. 纤维（Fibres） 3. 导管（Vessels） 4. 星状毛（Asteriate hairs）

黄　芩

Huangqin

RADIX SCUTELLARIAE

本品为唇形科植物黄芩*Scutellaria baicalensis* Georgi 的干燥根。

[显微特征]　本品粉末：黄色。韧皮纤维单个散在或数个成束，梭形，长60～250 μm，直径9～33 μm，壁厚，孔沟细。石细胞类圆形、类方形或长方形，壁较厚或甚厚。木栓细胞棕黄色，表面观多角形。网纹导管多见，直径24～72 μm。木纤维多碎断，直径约12 μm，有稀疏斜纹孔。淀粉粒甚多，单粒类球形，直径2～10 μm，脐点明显，复粒由2～3分粒组成。（图1）

Powder: Yellow. Phloem fibres scattered singly or in bundles, fusiform, 60～250 μm long, 9～33 μm in diameter, thick-walled, with fine pit-canals. Stone cells subrounded, subsquare or rectangular, relatively thick walled or heavily thick walled. Cork cells brownish-yellow, polygonal in surface view. Reticulated vessels numerous, 24～72 μm in diameter. Wood fibres frequently broken, about 12 μm in diameter, sparsely with oblique pits. Starch granules abundant, simple granules spheroidal, 2～10 μm in diameter, hilum distinct, compound granules composed of 2～3 components. （Fig 1）

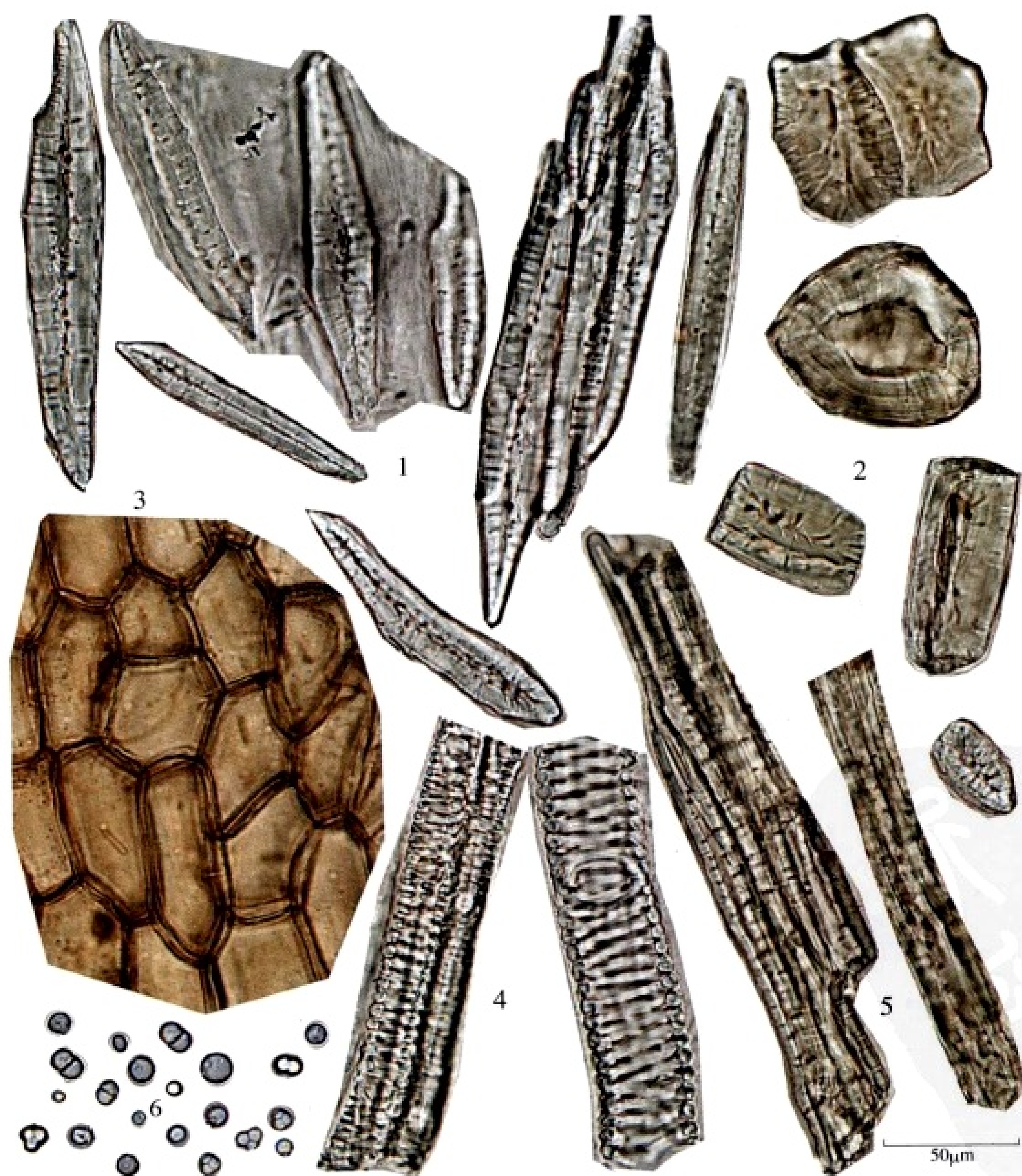


图1　黄芩（*Scutellaria baicalensis* 根）粉末

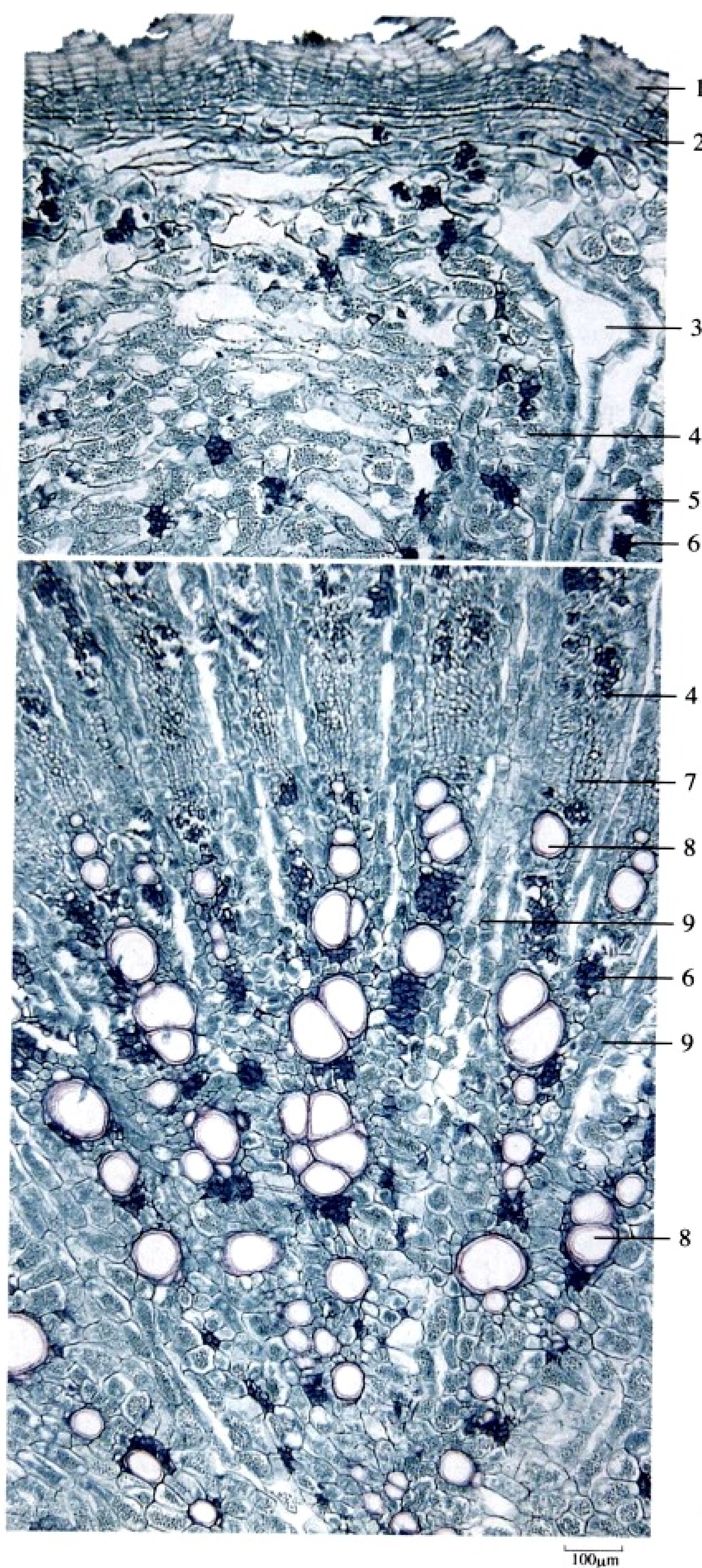
[Fig1　Powder of root from *Scutellaria baicalensis*]

1. 韧皮纤维（Phloem fibres）　2. 石细胞（Stone cells）　3. 木栓细胞（Cork cells）　4. 导管（Vessels）
5. 木纤维（Xylary fibres）　6. 淀粉粒（Starch granules）

黄　芪

Huangqi

RADIX ASTRAGALI



本品为豆科植物蒙古黄芪*Astragalus membranaceus*（Fisch.） Bge. var. *monghyolicus*（Bge.） Hsiao或膜荚黄芪*Astragalus membranaceus*（Fisch.） Bge. 的干燥根。

［显微特征］　本品横切面：木栓细胞多列；栓内层为3～5列厚角细胞。韧皮部射线外侧常弯曲，有裂隙；纤维成束，壁厚，木化或微木化，与筛管群交互排列；近栓内层处有时可见石细胞。形成层成环。木质部导管单个散在或2～3个相聚；导管间有木纤维；射线中有时可见单个或2～4个成群的石细胞。薄壁细胞含淀粉粒。（图1）

Transverse section: Cork consisting of many layers of cells. Phelloderm of 3 ~ 5 layers of collenchymatous cells. Outer part of phloem rays often curved and fissured; fibres in bundles, walls thickened and lignified or slightly lignified, arranged alternately with sieve tube groups; stone cells sometimes visible near phelloderm. Cambium in a ring. Xylem vessels scattered singly or 2 ~ 3 aggregated in groups; wood fibres occurring among vessels; sometimes stone cells visible in rays, singly or 2 ~ 4 in groups. Parenchymatous cells containing starch granules. （Fig 1）

图1　黄芪（*Astragalus membranaceus* var. *mongholicus* 根）横切面

[Fig1　Transverse section of root from *Astragalus membranaceus* var. *mongholicus*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 裂隙（Clefts）　4. 韧皮部（Phloem）　5. 韧皮射线（Phloem rays）　6. 纤维束（Fibres）　7. 形成层（Cambium）　8. 木质部（Xylem）　9. 木射线（Xylem rays）

本品粉末：黄白色。纤维成束或散离，直径8～30μm，壁厚，表面有纵裂纹，初生壁常与次生壁分离，两端常断裂成须状，或较平截。具缘纹孔导管无色或橙黄色，具缘纹孔排列紧密。石细胞少见，圆形、长圆形或形状不规则，壁较厚。（图2）

Powder: Yellowish-white. Fibres in bundles or scattered, 8～30 μm in diameter, thick-walled, with longitudinal fissures on the surface, the primary walls often separated from the secondary walls, both ends often broken to tassel-like, or slightly truncated. Bordered-pitted vessels colourless or orange, bordered pits arranged closely. Stone cells occasionally visible, rounded, oblong or irregular, slightly thick-walled. （Fig 2）



图2 黄芪（*Astragalus membranaceus* var. *mongholicus* 根）粉末
[Fig2 Powder of root from *Astragalus membranaceus* var. *mongholicus*]
1. 纤维束（Fibres bundles） 2. 导管（Vessels） 3. 石细胞（Stone cells）

黄　连

Huanglian

RHIZOMA COPTIDIS

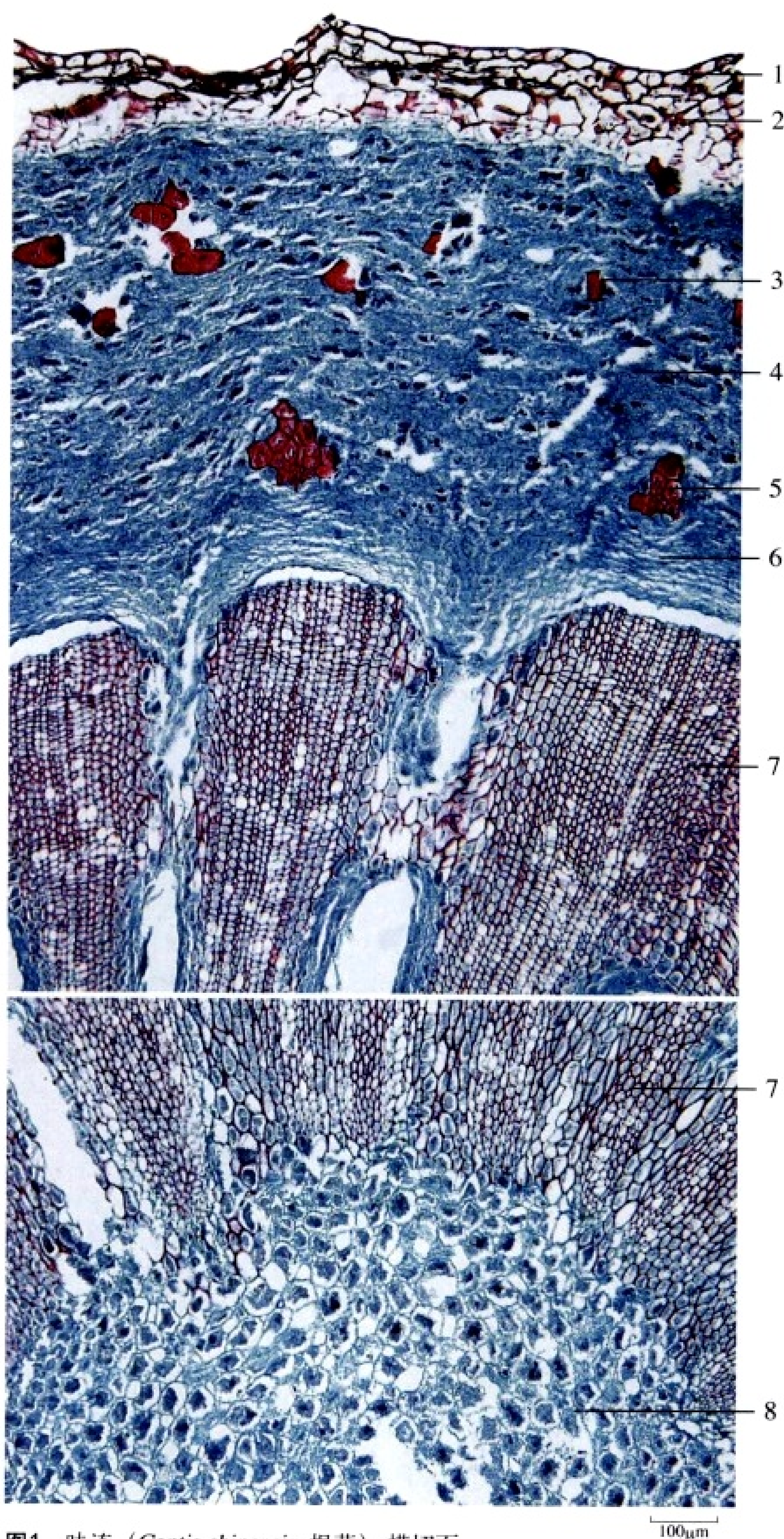


图1　味连（*Coptis chinensis* 根茎）横切面

[Fig1　Transverse section of rhizome from *Coptis chinensis*]

1. 表皮(Epidermis)　2. 木栓层(Cork)　3. 石细胞群(Stone cells)　4. 皮层(Cortex)　5. 中柱鞘纤维束(Pericyclic fibre bundles)　6. 韧皮部(Phloem)　7. 木质部(Xylem)　8. 髓 (Pith)

本品为毛茛科植物黄连*Coptis chinensis* Franch.、三角叶黄连*Coptis deltoidea* C. Y. Cheng et Hsiao或云连*Coptis teeta* Wall.的干燥根茎。

[显微特征]　本品横切面：味连　木栓层为数列细胞，其外有表皮，常脱落。皮层较宽，石细胞单个或成群散在。中柱鞘纤维成束或伴有少数石细胞，均显黄色。维管束外韧型，环列。木质部黄色，均木化，木纤维较发达。髓部均为薄壁细胞，无石细胞。（图1、2）

Transverse section of rhizome: *Coptis chinensis* Cork cells in several layers. Cortex broader, stone cells singly scattered or grouped. Pericycle fibres in bundles or accompanied by a few stone cells, both yellow. Collateral vascular bundles arranged in a ring. Xylem yellow, lignified, xylary fibres well developed. Pith consisting of parenchymatous cells, stone cells absent. (Fig 1, 2)

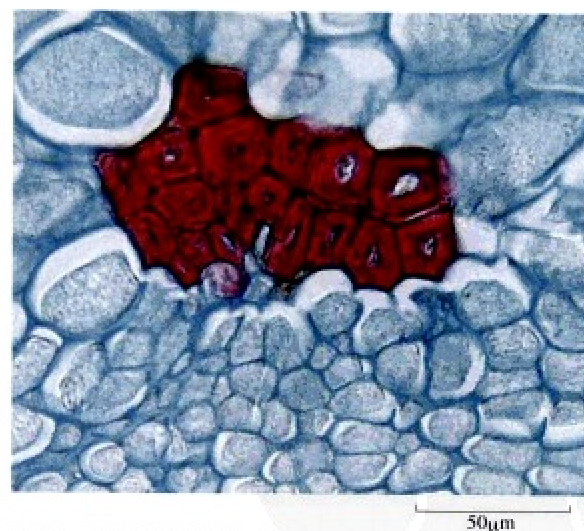


图2　示中柱鞘纤维束

[Fig2　Showing pericyclic fibre bundle]



雅连　髓部有石细胞。（图3）

云连　皮层、中柱鞘及髓部均无石细胞。（图4）

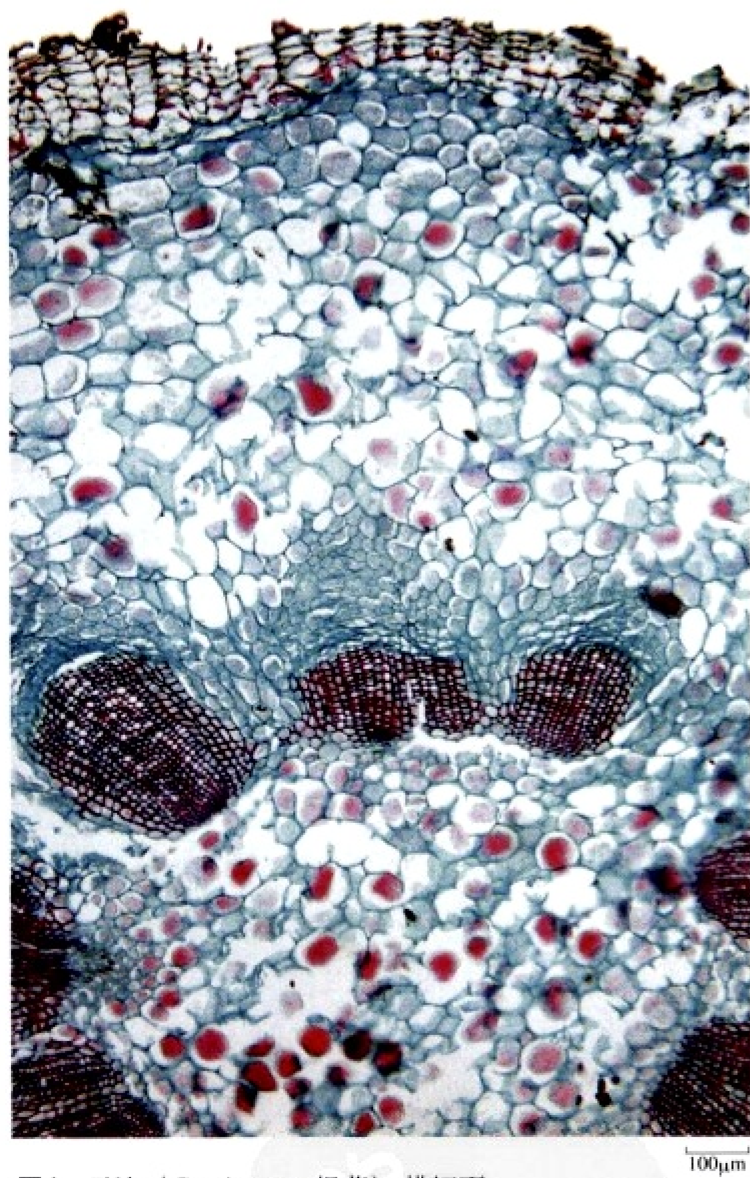
Coptis deltoidea　Stone cells visible in pith.（Fig 3）

Coptis teeta　Stone cells absent from cortex, pericycle and pith.（Fig 4）

100μm

图3　雅连（*Coptis deltoidea* 根茎）横切面

[Fig3　Transverse section of rhizome from *Coptis deltoidea*]



100μm

图4　云连（*Coptis teeta* 根茎）横切面

[Fig4　Transverse section of rhizome from *Coptis teeta*]

黄　柏

Huangbo

CORTEX PHELLODENDRI CHINENSIS

本品为芸香科植物黄皮树 *Phellodendron chinense* Schneid. 的干燥树皮。

[显微特征]　本品粉末：鲜黄色。纤维鲜黄色，直径16～32μm，常成束，周围细胞含草酸钙方晶，形成晶纤维；含晶细胞壁木化增厚。石细胞鲜黄色，类圆形或纺锤形，直径35～128μm，有的呈分枝状，枝端锐尖，壁厚，层纹明显；有的可见大型纤维状石细胞，长可达900μm。草酸钙方晶众多。(图1)

Powder: Bright yellow. Fibres bright yellow, 16～32 μm in diameter, often in bundles, surrounded by cells containing prisms of calcium oxalate, forming crystal fibres; the walls of crystal cells lignified and thickened. Stone cells bright yellow, subrounded, 35～128 μm in diameter, some branched, sharp at the top, walls thickened, with distinct striations; sometimes large fibrous stone cells visible, up to 900 μm in length. Prisms of calcium oxalate numerous. (Fig 1)



图1　黄柏（*Phellodendron chinense* 树皮）粉末

[Fig1　Powder of bark from *Phellodendron chinense*]

1. 晶纤维（Crystal fibres）　2. 石细胞（Stone cells）　3. 草酸钙方晶（Prisms of calcium oxalate）

黄 精
Huangjing
RHIZOMA POLYGONATI

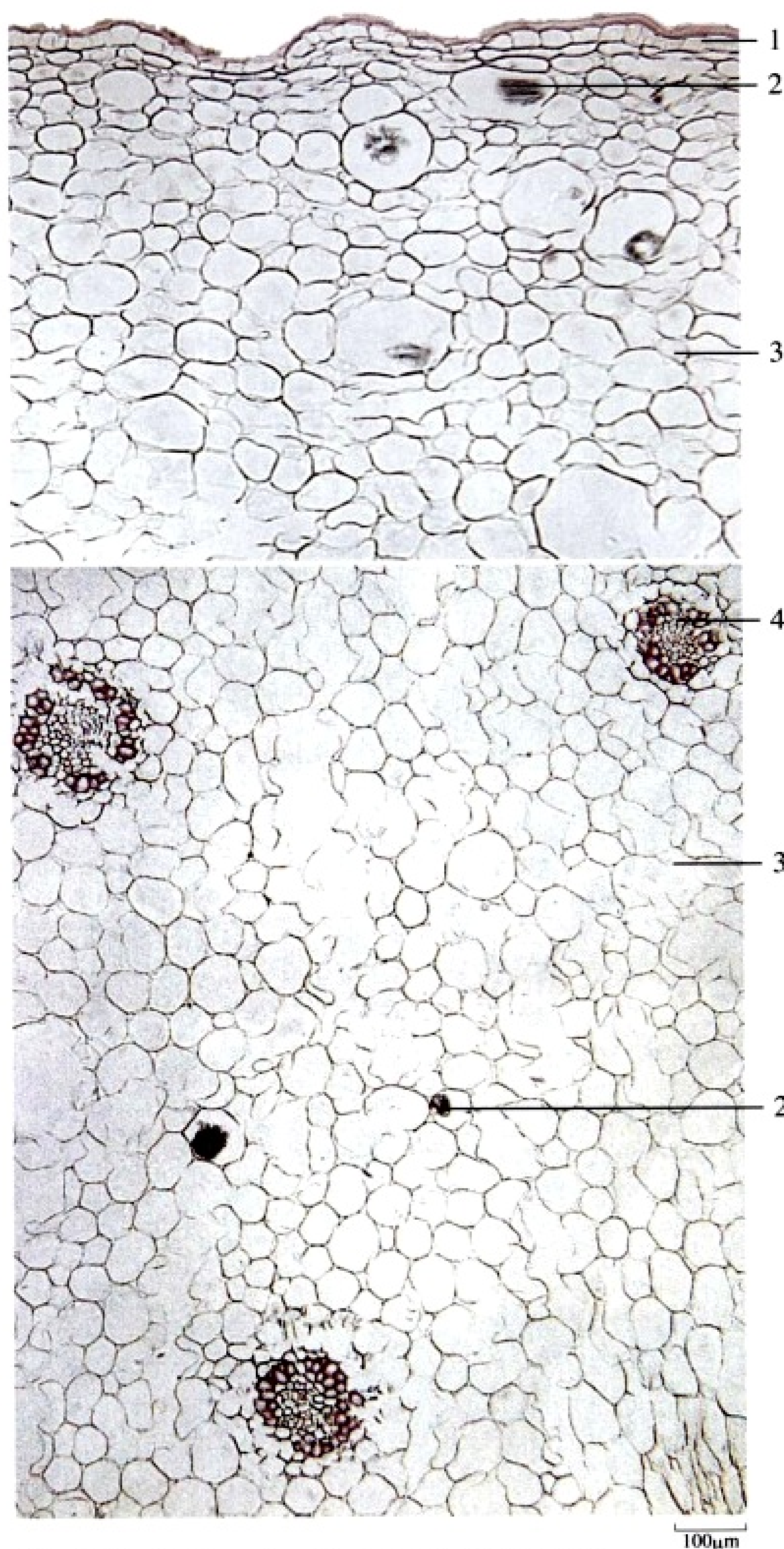


图1 黄精（*Polygonatum kingianum* 根茎）横切面

[Fig1 Transverse section of rhizome from *Polygonatum kingianum*]

1. 表皮（Epidermis） 2. 黏液细胞含草酸钙针晶（Mucilaginous cells containing raphides of calcium oxalate） 3. 薄壁组织（Parenchyma） 4. 周木型维管束（Amphivasal vascular bundles）

本品为百合科植物滇黄精*Polygonatum kingianum* Coll. et Hemsl.、黄精*Polygonatum sibiricum* Red. 或多花黄精*Polygonatum cyrtonema* Hua 的干燥根茎。按形状不同，习称"大黄精"、"鸡头黄精"、"姜形黄精"。

[显微特征] 本品横切面：**大黄精** 表皮细胞外壁较厚。薄壁组织间散有多数大的黏液细胞，内含草酸钙针晶束。维管束散列，大多周木型。（图1、2）

Transverse section of rhizome.

Dahuangjing: External walls of epidermal cells relatively thick. Numerous large mucilaginous cells containing raphides of calcium oxalate, scattered in parenchyma. Vascular bundles scattered, usually in amphivasal-type. (Fig 1, 2)

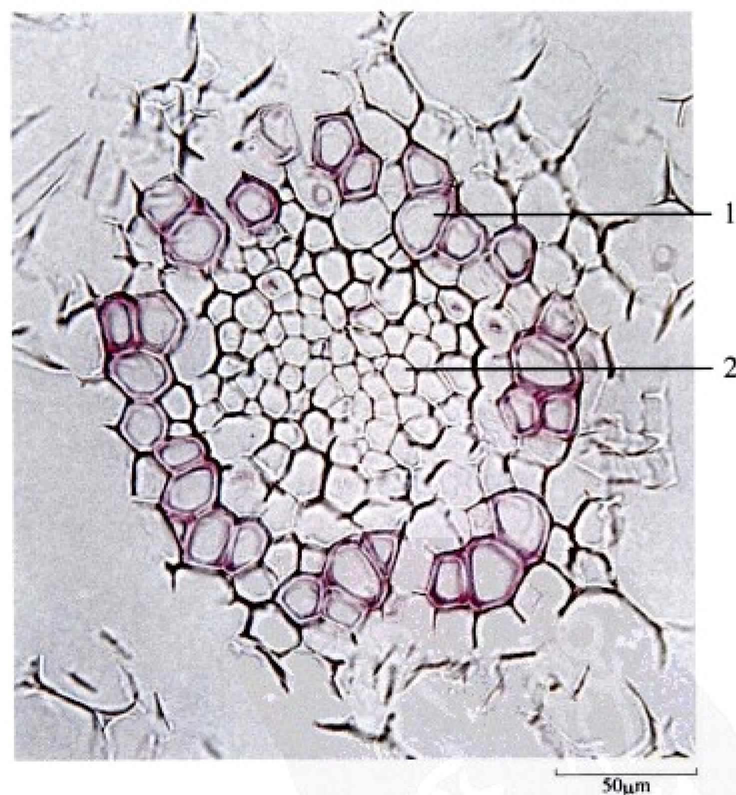


图2 周木型维管束放大

[Fig2 Amphivasal vascular bundles magnified]

1. 导管（Vessels） 2. 筛管群（Sieve tube groups）

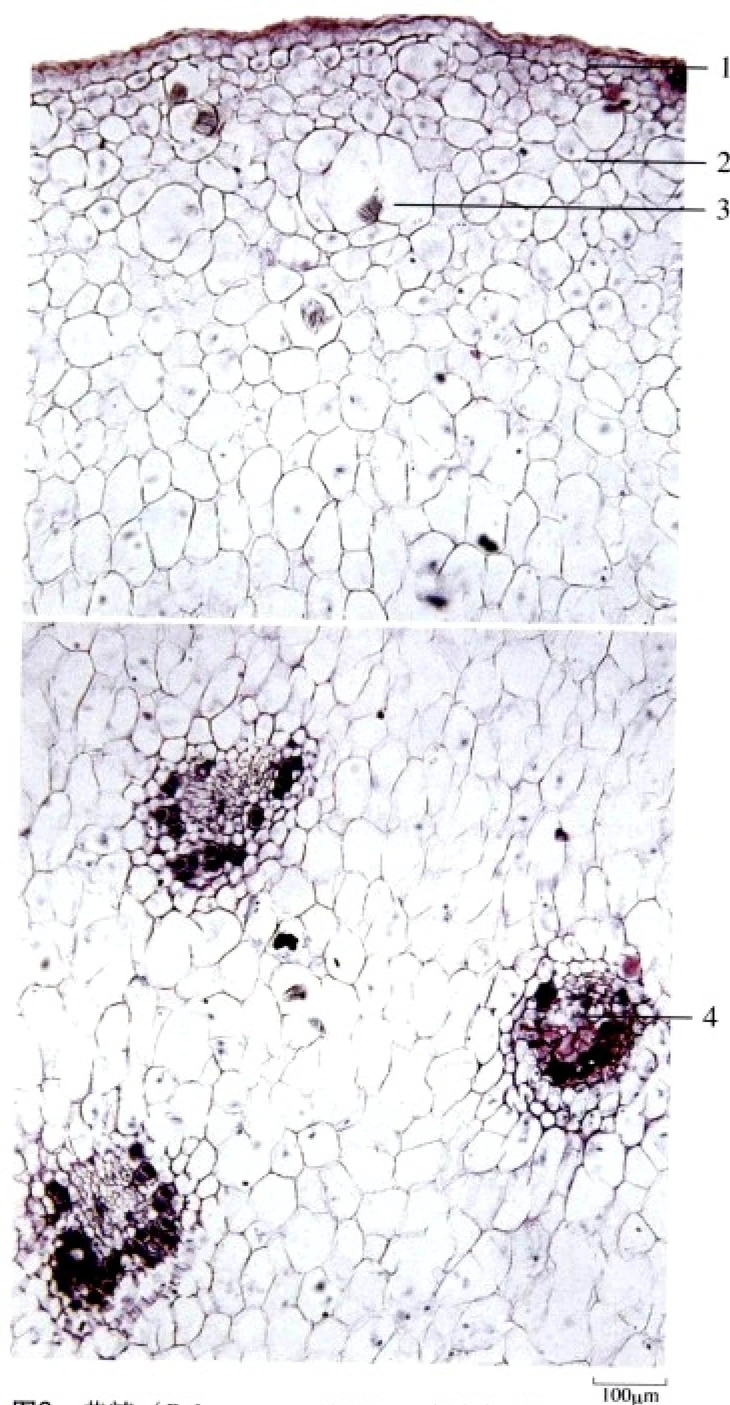


图3 黄精（*Polygonatum sibiricum* 根茎）横切面

[Fig3 Transverse section of rhizome from *Polygonatum sibiricum*]

1. 表皮（Epidermis） 2. 薄壁组织（Parenchyma） 3. 黏液细胞含草酸钙针晶（Mucilaginous cells containing raphides of calcium oxalate）
4. 外韧型维管束（Collateral vascular bundles）

鸡头黄精、姜形黄精 维管束多为外韧型。（图3～5）

Jitouhuangjing and Jiangxinghuangjing: Vascular bundles usually in collateral-type.（Fig 3～5）

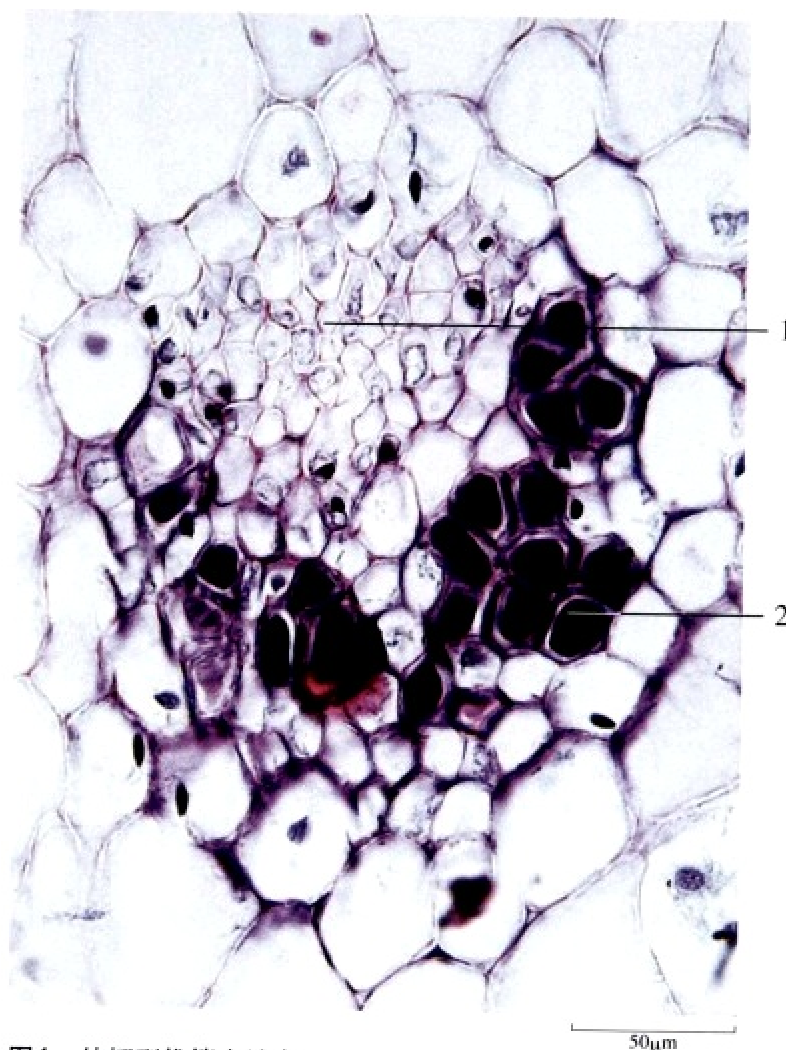


图4 外韧型维管束放大

[Fig4 Collateral vascular bundles magnified]

1. 筛管群（Sieve tube groups） 2. 导管（Vessels）



图5 示黏液细胞内含草酸钙针晶束

[Fig5 Showing mucilaginous cells containing raphides of calcium oxalate]

黄　藤

Huangteng

CAULIS FIBRAUREAE

本品为防己科植物黄藤 *Fibraurea recisa* Pierre. 的干燥藤茎。

[显微特征]　**本品粉末**：淡黄色。导管为网纹导管和具缘纹孔导管，多破碎，完整者直径至150μm。木栓细胞黄棕色，表面观类多角形，有的壁木化增厚似石细胞。木纤维单个散在或成束，壁增厚，具缘纹孔稀疏。石细胞单个散在或成群，类方形或多角形，直径40～120μm，壁厚，层纹、孔沟明显，有的胞腔内含棕色物。木射线细胞长方形，纹孔较明显。草酸钙方晶直径20～40μm。淀粉粒多为复粒，由2～5分粒组成。（图1）

Powder：Pale yellow. Vessels reticulate or bordered pitted thickened, mostly broken, up to 150 μm in diameter when whole. Cork cells yellowish-brown, subpolygonal in surface view, some with lignin-thickened walls like stone cells. Xylem fibres singly scattered or in bundles, with thickened walls and sparse bordered pits. Stone cells single or in groups, subsquare or polygonal, 40～120 μm in diameter, thickened walls with distinct striations and pit canals, some with brown contents in lumina. Cells of xylem rays oblong, pits obvious. Prisms of calcium oxalate 20～40 μm in diameter. Starch granules mostly compound, composed of 2～5 components.（Fig 1）



图1　黄藤（*Fibraurea recisa* 藤茎）粉末

[Fig1　Powder of lianoid stem from *Fibraurea recisa*]

1. 导管（Vessels）　2. 石细胞（Stone cells）　3. 木纤维（Xylem fibres）　4. 草酸钙方晶（Prisms of calcium oxalate）　5. 木栓细胞（Cork cells）　6. 木射线细胞（Xylem ray cells）　7. 淀粉粒（Starch granules）

菝 葜

Baqia

RHIZOMA SMILACIS CHINAE

本品为百合科植物菝葜*Smilax china* L. 的干燥根茎。

[显微特征] **本品粉末：**红棕色。淀粉粒多为单粒，类圆形，直径5～30μm，脐点点状、裂缝状或飞鸟状。石细胞单个散在或数个成群，淡黄色或红棕色，呈类圆形、长椭圆形、类方形或不规则形，具明显分枝状孔沟，胞腔较小，具椭圆形纹孔，有的胞腔中含红棕色物。纤维易见，成束或散在，淡黄色或深棕色。草酸钙针晶多散在，偶有成束存在于黏液细胞中,长75～140μm。(图1)

Powder: Reddish-brown. Starch granules mostly simple, subrounded, 5～30 μm in diameter, hilum pointed, cleft or flyer-shaped. Stone cells singly scattered or several in groups, pale yellow or reddish-brown, subrounded, long elliptical, subsquare or irregular, with distinct branched pit canals, lumina small with oblong pits, some lumina containing reddish-brown content. Fibres frequent, in groups or scattered, pale yellow or deep brown. Needle crystals of calcium oxalate mostly scattered, occasionally in bundles occurring in mucilage cells, 75～140 μm long.（Fig 1）



图1 菝葜（*Smilax china* 根茎）粉末

[Fig1 Powder of rhizome of *Smilax china*]

1. 淀粉粒（Starch granules） 2. 石细胞（Stone cells） 3. 纤维（Fibres） 4. 草酸钙针晶（Needle crystals of calcium oxalate）

菟丝子

Tusizi

SEMEN CUSCUTAE

本品为旋花科植物菟丝子*Cuscuta chinensis* Lam. 的干燥成熟种子。

[显微特征] 本品粉末：黄褐色或深褐色。种皮表皮细胞断面观呈类方形或类长方形，侧壁增厚；表面观呈圆多角形，角隅处壁明显增厚。种皮栅状细胞成片，断面观2列，外列细胞较内列细胞短，具光辉带，位于内侧细胞的上部；表面观呈多角形，皱缩。胚乳细胞呈多角形或类圆形，胞腔内含糊粉粒。子叶细胞含糊粉粒及脂肪油滴。（图1）

Powder: Yellowish-brown or dark brown. Epidermal cell of testa subsquare or subrectangular in section view, with thickened lateral walls; rounded polygonal in surface view, walls markedly thickened at corner. Palisade cells of testa in pieces, two rows of cells visible in section view, cells of outer row shorter than those of inner row, with a light line in upper part of the inner row of cells; polygonal in surface view, shrunken. Endosperm cells polygonal or subrounded, containing aleurone grains in lumina. Cotyledon cells filled with aleurone grains and fatty oil droplets. (Fig 1)



图1 菟丝子（*Cuscuta chinensis* 种子）粉末

[Fig1 Powder of seed from *Cuscuta chinensis*]

1. 种皮表皮细胞[Epidermal cells of testa（a. 断面观Sectional view b. 表面观Surface view）] 2. 种皮栅状细胞[Palisade cells of testa（a. 断面观Sectional view b. 表面观Surface view）] 3. 胚乳细胞（Endosperm cells） 4. 子叶细胞（Cotyledon cells）

菊　苣

Juju

HERBA CICHORII
RADIX CICHORII

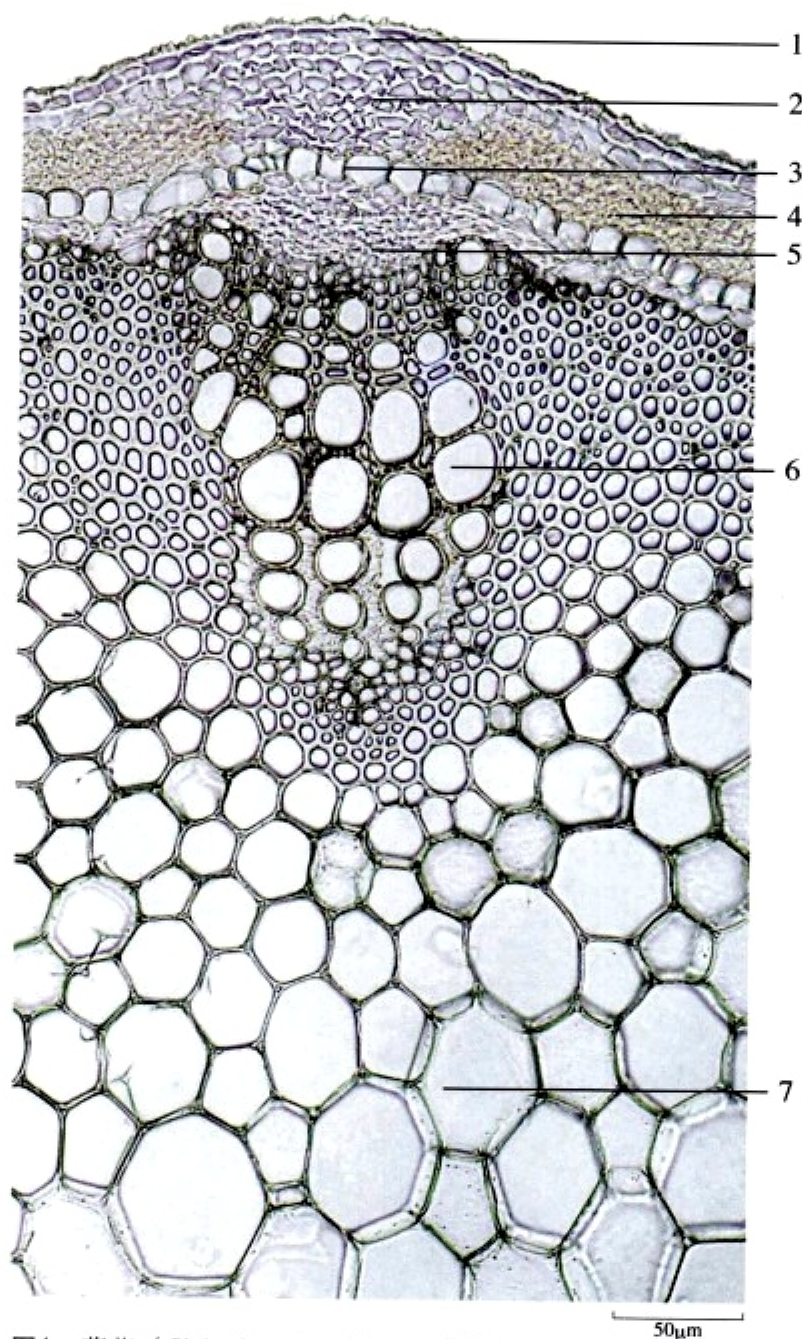


图1　菊苣（*Cichorium glandulosum* 茎直径5mm）横切面

[Fig 1　Transverse section of stem from *Cichorium glandulosum*]

1. 表皮（Epidermis）　2. 厚角细胞（Collenchymatous cells）
3. 内皮层（Endodermis）　4. 皮层细胞（Cortex cells）　5. 韧皮部（Phloem）
6. 木质部（Xylem）　7. 髓（Pith）

本品为菊科植物毛菊苣*Cichorium glandulosum* Boiss. et Huet或菊苣*Cichorium intybus* L. 的干燥地上部分或根。

[显微特征]　本品横切面：**毛菊苣茎**：表皮偶有多细胞腺毛。棱角处皮下为厚角细胞，皮层细胞充满黄棕色内含物；内皮层细胞凯氏点较明显。中柱鞘纤维不发达，维管束外韧型，约20～25束；导管类圆形，单个或数个环列于木质部，直径8～50μm。（图1、2）

Transverse Section: stem from *Cichorium glandulosum:* Epidermis sometimes with multicellular glandular hairs. Collenchymatous cells occurring under epidermis at the ridges, cortex cells containing yellowish-brown contents; casparian dots on endodermal cells distinct. Pericycle fibres undeveloped, vascular bundles collateral, about 20 ~ 25 bundles. Vessels subround, scattered singly or several arranged in ring-shaped, 8 ~ 50 μm in diameter.（Fig 1, 2）



图2　示多细胞腺毛

[Fig2　Showing multicellular glandular hair]

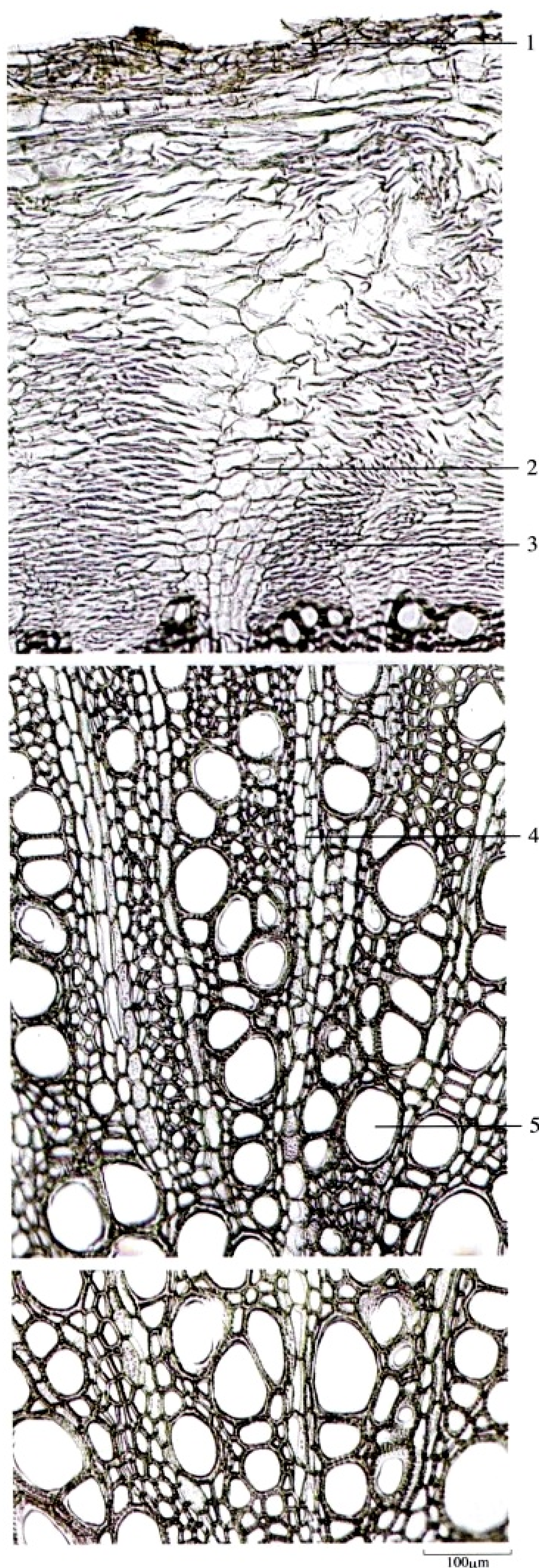


图3 菊苣（*Cichorium glandulosum* 根直径5mm）横切面
[Fig3 Transverse section of root from *Cichorium glandulosum*]
1. 木栓层（Cork） 2. 韧皮射线（Phloem rays） 3. 韧皮部（Phloem）
4. 木射线（Xylem rays） 5. 木质部（Xylem）

毛菊苣根：木栓层2～3列细胞，棕黄色。韧皮射线细胞单列或多列。形成层明显；木质部导管散在或2～6个径向排列，木射线1～6列细胞宽，细胞壁薄，纹孔明显。（图3、4）

Root from *Cichorium glandulosum:* Cork consisting of 2 ~ 3 layers of cells, brownish-yellow. Phloem rays 1 to several cells wide. Cambium distinct. Xylem vessels scattered or 2 ~ 6 radically arranged, xylem rays 1 ~ 6 cells wide, thin-walled, pits distinct.（Fig 3, 4）



图4 示木射线细胞纹孔
[Fig 4 Showing pits in cells of xylem ray]

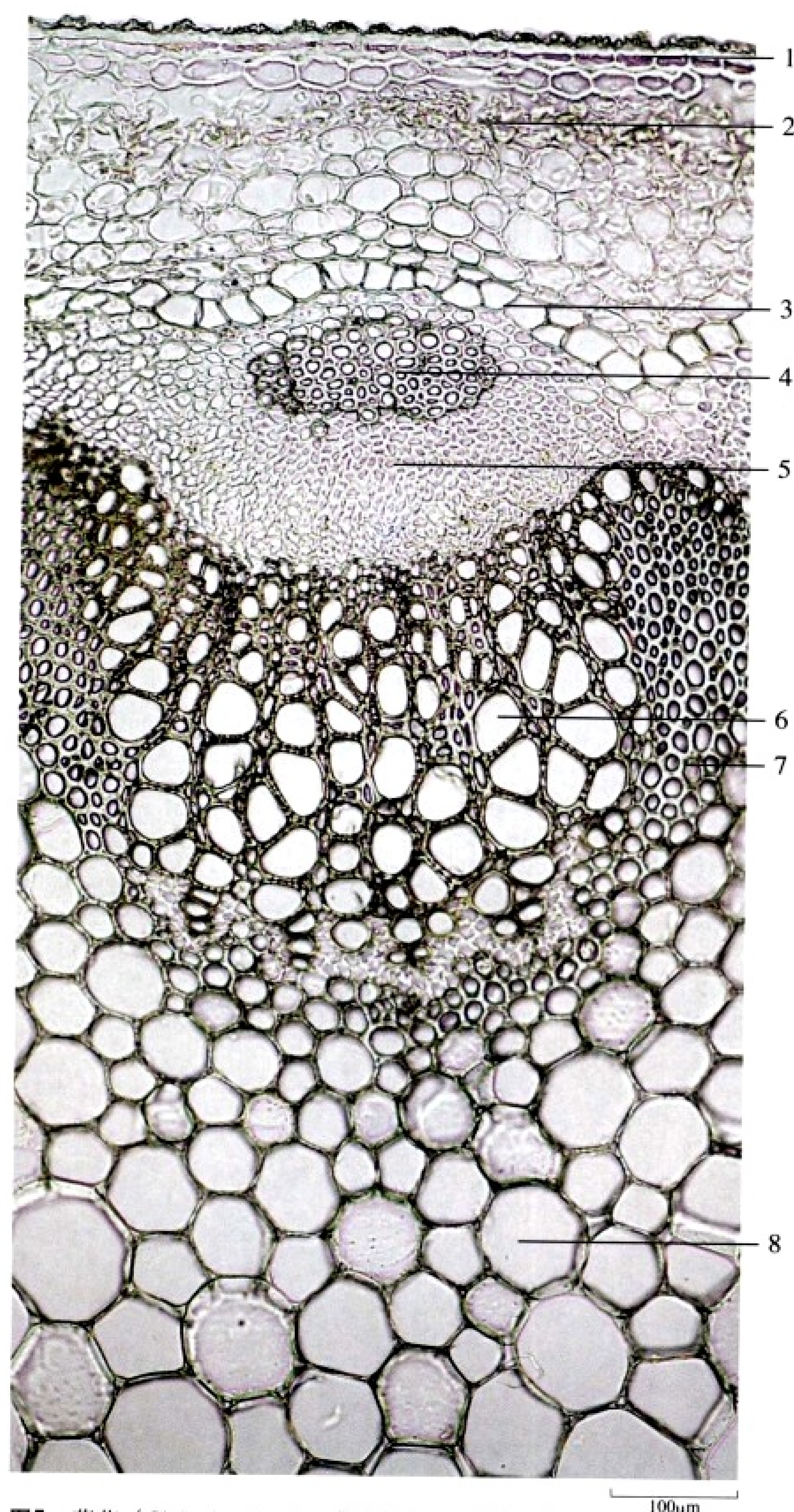


图5 菊苣（*Cichorium intybus* 茎直径3mm）横切面
[Fig5 Transverse section of stem from *Cichorium intybus*]
1. 表皮（Epidermis） 2. 皮层（Cortex） 3. 内皮层（Endodermis）
4. 中柱鞘纤维（Pericycle fibres） 5. 韧皮部（Phloem） 6. 木质部（Xylem）
7. 木纤维（Xylem fibres） 8. 髓（Pith）

菊苣茎：中柱鞘纤维较发达，导管数个或十数个相聚，间断环列于木质部。（图5、6）

Stem from *Cichorium intybus:* Pericycle fibres relatively developed, vessels several or ten and more grouped, and arranged in rings interruptedly. (Fig 5, 6)

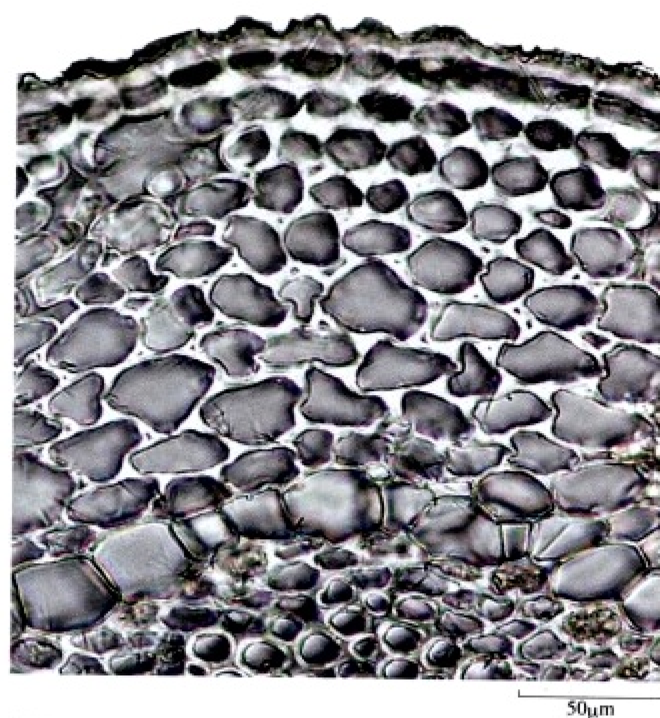


图6 示茎棱脊处皮层的厚角细胞
[Fig6 Showing collenchymatous cells of cortex at ridge]

菊苣根：皮层狭窄，木质部约占横切面1/2。（图7、8）

Root from *Cichorium intybus:* Cortex narrow, xylem occupying about half of the transverse section.（Fig 7, 8）

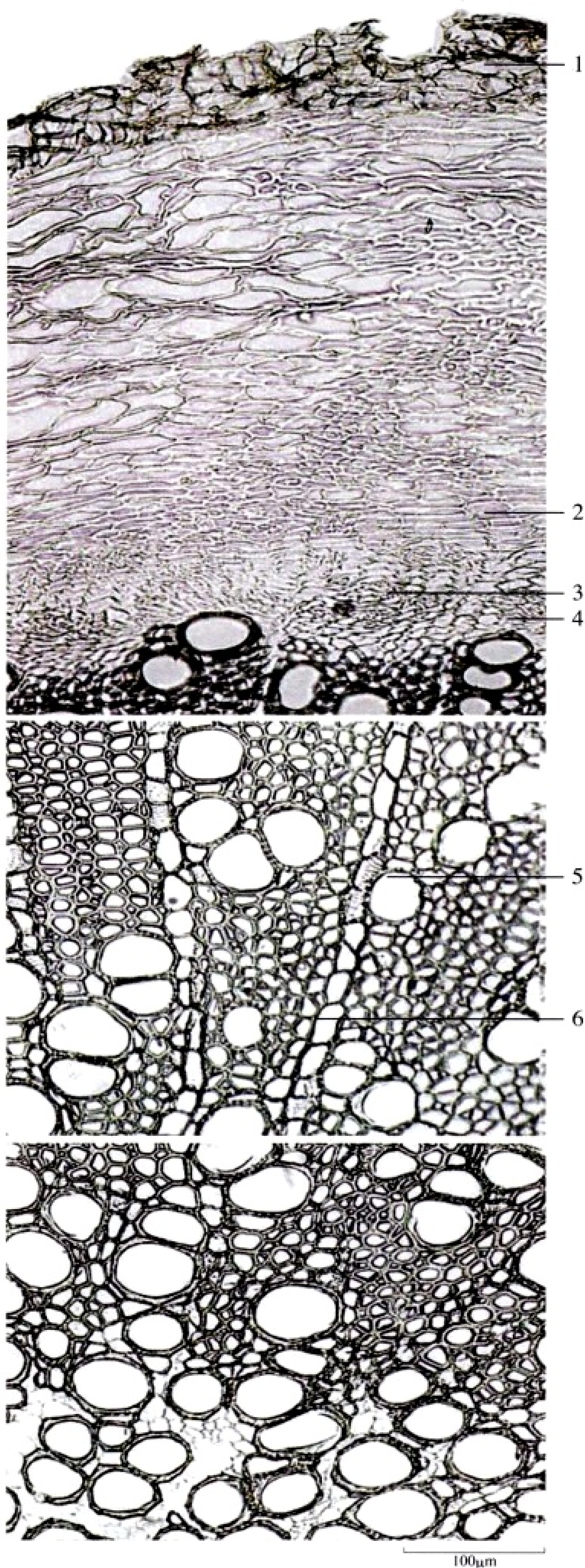


图7 菊苣（*Cichorium intybus* 根直径4mm）横切面

[Fig7 Transverse section of root from *Cichorium intybus*]

1. 木栓层（Cork） 2. 韧皮射线（Phloem rays） 3. 韧皮部（Phloem） 4. 形成层（Cambium） 5. 木质部（Xylem） 6. 木射线（Xylem rays）



图8 示木射线细胞纹孔

[Fig8 Showing pits in cells of xylem ray]

常　山
Changshan
RADIX DICHROAE

本品为虎耳草科植物常山*Dichroa febrifuga* Lour. 的干燥根。

[显微特征]　**本品横切面**：木栓细胞数列。栓内层窄，少数细胞内含树脂块或草酸钙针晶束。韧皮部较窄，草酸钙针晶束较多。形成层呈不规则波状环。木质部占主要部分，均木化，射线宽窄不一；导管多角形，单个散在或数个相聚，有的含黄色侵填体。薄壁细胞含淀粉粒。（图1、2）

Transverse section: Cork consisting of several layers of cells. Phelloderm narrow, a few cells containing resinous masses or raphides of calcium oxalate. Phloem narrow, raphides of calcium oxalate numerous. Cambium in an irregular, wavy ring. Xylem occupying the most part of root, completely lignified, rays varying in width; vessels polygonal, singly scattered or aggregated, some containing yellow tyloses. Parenchymatous cells containing starch granules. （Fig 1,2）

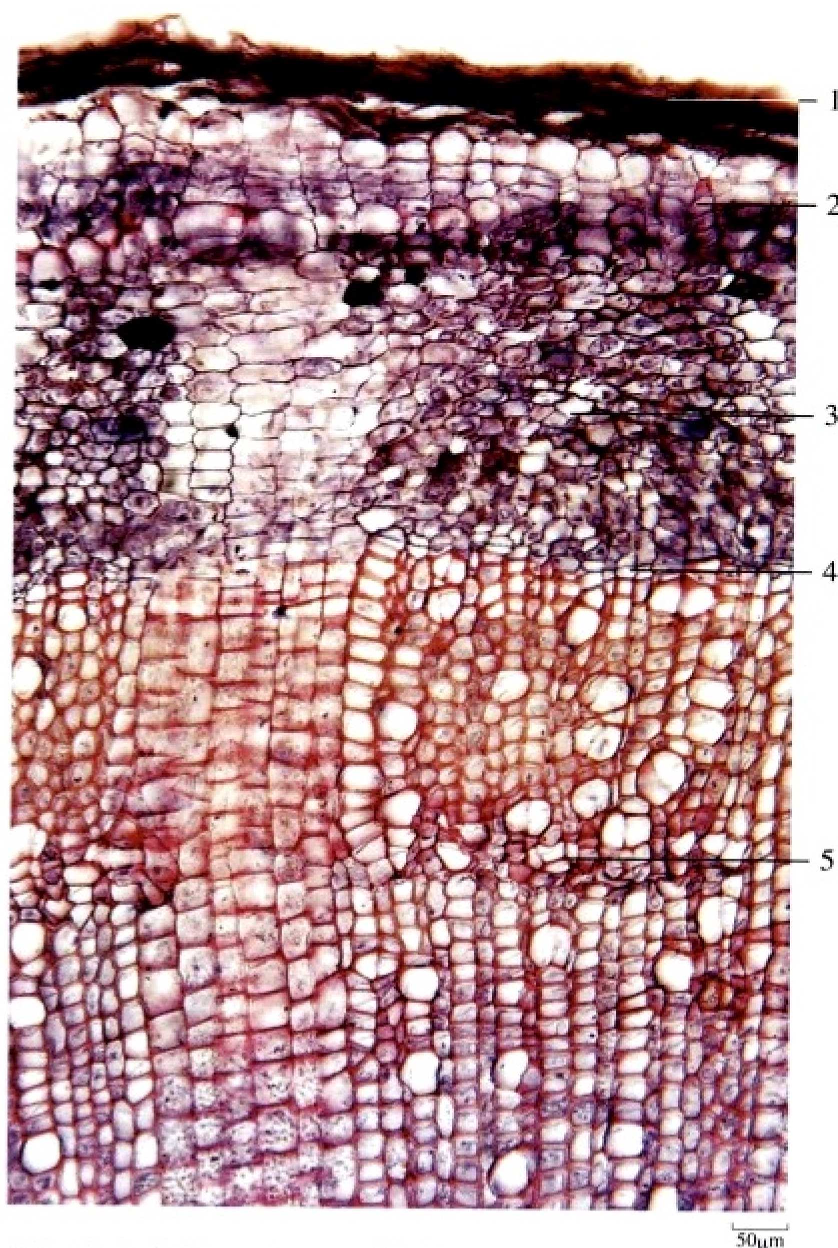


图1　常山（*Dichroa febrifuga* 根）横切面

[Fig 1　Transverse section of root from *Dichroa febrifuga*]

1. 木栓层(Cork)　2. 皮层（Cortex）　3. 韧皮部(Phloem)　4. 形成层(Cambium)　5. 木质部（Xylem）

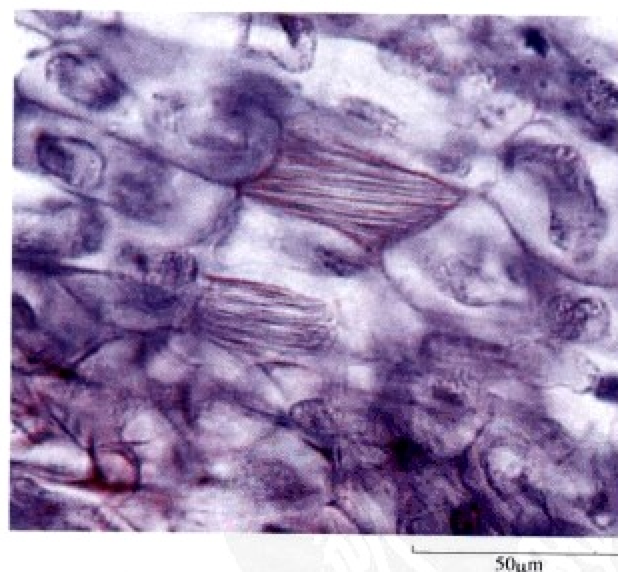


图2　示薄壁细胞中含草酸钙针晶

[Fig 2　Showing parenchymatous cells containing raphides of calcium oxalate]

蛇 床 子

Shechuangzi

FRUCTUS CNIDII

本品为伞形科植物蛇床 *Cnidium monnieri* （L.） Cuss. 的干燥成熟果实。

[显微特征] **本品粉末**：黄绿色。油管多破碎，内壁有金黄色分泌物，可见类圆形油滴。内果皮镶嵌层细胞浅黄色，表面观长条形，壁呈连珠状增厚。薄壁细胞类方形或类圆形，无色，壁条状或网状增厚。草酸钙簇晶或方晶直径3～6μm。（图1）

Powder: Yellowish-green. Vittae frequently broken, inner walls containing golden yellow secretions, subrounded oil droplets visible. Parquet cells of endocarp pale yellow, long slat-shaped in surface view, walls beaded thickened. Parenchymatous cells subsquared or subrounded, colourless, slat-shaped or reticulated thickened on surface. Clusters or prisms of calcium oxalate 3～6 μm in diameter. （Fig 1）



图1 蛇床子（*Cnidium monnieri* 果实） 粉末

[Fig1 Powder of fruit of *Cnidium monnieri*]

1. 油管（Vittae） 2. 内果皮镶嵌层细胞（Parquet cells of endocarp） 3. 薄壁细胞（Parenchymatous cells） 4. 草酸钙簇晶（Clusters of calcium oxalate） 5. 内胚乳（Endosperm）

银 柴 胡

Yinchaihu

RADIX STELLARIAE



图1 银柴胡（*Stellaria dichotoma* var. *lanceolata* 根）横切面
[Fig1 Transverse section of root from *Stellaria dichotoma* var. *lanceolata*]
1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 韧皮部（Phloem）
4. 木质部（Xylem） 5. 草酸钙砂晶（Sand crystals of calcium oxalate）
6. 射线细胞（Ray cells）

本品为石竹科植物银柴胡 *Stellaria dichotoma* L. var. *lanceolata* Bge. 的干燥根。

[显微特征] **本品横切面**：木栓细胞数列至10余列。栓内层较窄。韧皮部筛管群明显。形成层成环。木质部发达。射线宽至10余列细胞。薄壁细胞含草酸钙砂晶，以射线细胞中为多见。（图1、2）

Transverse section: Cork consisting of several to 10 or more layers of cells. Phelloderm narrow. Sieve tube groups of phloem distinct. Cambium in a ring. Xylem well developed, rays more than 10 cells wide. Parenchymatous cells containing sand crystals of calcium oxalate, mainly in ray cells.（Fig 1, 2）

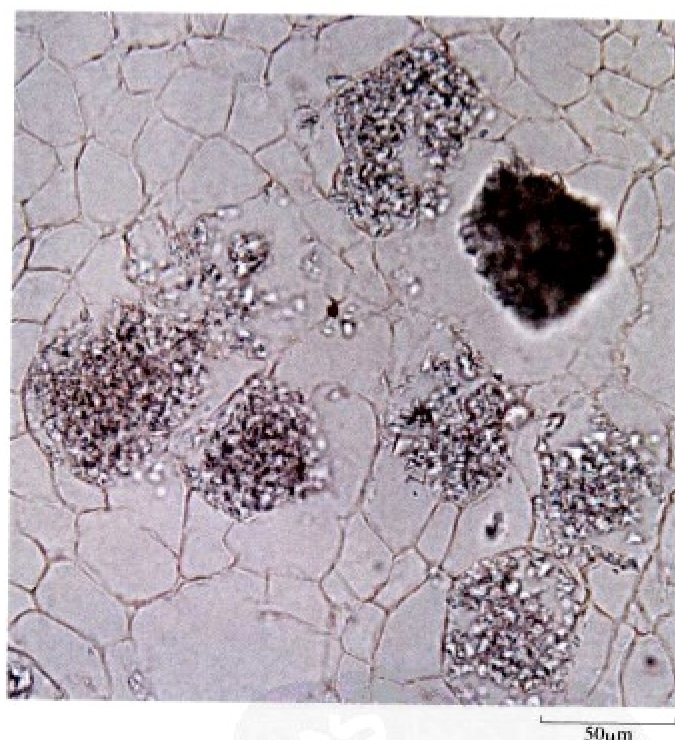


图2 示薄壁细胞含草酸钙砂晶
[Fig2 Showing parenchymatous cells containing sand crystals of calcium oxalate]

猪牙皂

Zhuyazao

FRUCTUS GLEDITSIAE ABNORMALIS

本品为豆科植物皂荚 *Gleditsia sinensis* Lam. 的干燥不育果实。

[显微特征] **本品粉末**：棕黄色。石细胞众多，类圆形、长圆形或形状不规则，直径15～53μm。纤维大多成束，直径10～25μm，壁微木化，周围细胞含草酸钙方晶及少数簇晶，形成晶纤维；纤维束旁常伴有类方形厚壁细胞。草酸钙方晶长 6～15μm；簇晶直径6～14μm。木化薄壁细胞甚多，纹孔及孔沟明显。果皮表皮细胞红棕色，表面观类多角形，壁较厚，表面可见颗粒状角质纹理。(图1)

Powder: Brownish-yellow. Stone cells numerous, subrounded, oblong or irregular in shape, 15 ~ 53 μm in diameter. Fibres frequently in bundles, 10 ~ 25 μm in diameter, with slightly lignified walls surrounded by cells containing prisms of calcium oxalate and a few clusters, forming crystal fibres; fibre bundles often accompanied by subsquare, thick-walled cells. Prisms of calcium oxalate 6 ~ 15 μm long; clusters 6 ~ 14 μm in diameter. Lignified parenchymatous cells numerous, pits and pit canals distinct. Epidermal cells of pericarp reddish-brown, polygonal in surface view, walls relatively thickened, with granular cuticular striations. (Fig 1)



图1　猪牙皂（*Gleditsia sinensis* 不育果实）粉末

[Fig1　Powder of sterile fruit from *Gleditsia sinensis*]

1. 石细胞（Stone cells） 2. 纤维（Fibres） 3. 晶纤维（Crystal fibres） 4. 草酸钙方晶（Prisms of calcium oxalate） 5. 草酸钙簇晶（Clusters of calcium oxalate） 6. 厚壁细胞（Sclerenchymatous cells） 7. 木化薄壁细胞（Lignified parenchymatous cells） 8. 果皮表皮细胞（Epidermal cells of pericarp）

猪　　苓

Zhuling

POLYPORUS

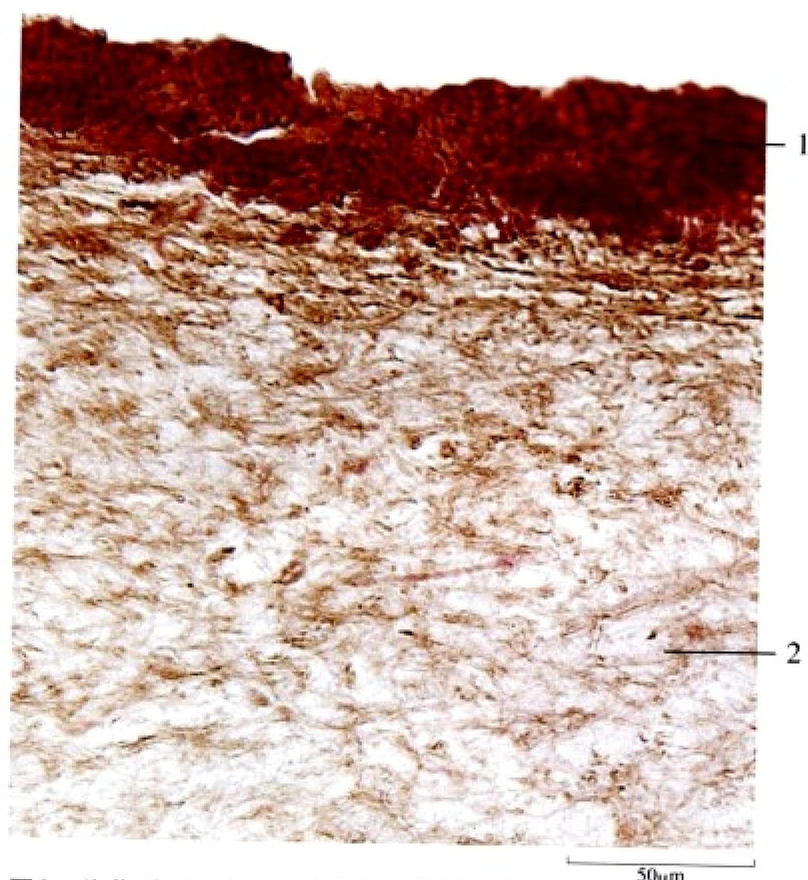


图1　猪苓（*Polyporus umbellatus* 菌核）切面

[Fig1　Section of sclerotium from *Polyporus umbellatus*]

1. 外层菌丝（Outer layer hyphae）　2. 内部菌丝（Inner hyphae）

本品为多孔菌科真菌猪苓*Polyporus umbellatus*（Pers.）Fries的干燥菌核。

[显微特征]　**本品切面**：全体由菌丝紧密交织而成。外层厚27～54μm，菌丝棕色，不易分离；内部菌丝无色，弯曲，直径2～10μm，有的可见横隔，有分枝或呈结节状膨大。菌丝间有众多草酸钙方晶，大多呈正方八面体形、规则的双锥八面体形或不规则多面体，直径3～60μm，长至68μm，有时数个结晶集合。（图1、2）

Section: All consisting of densely interweaved hyphae. The outer layer 27 ~ 54 μm thick, hyphae brown, uneasily separated; the inner hyphae colourless, sinuous, 2 ~ 10 μm in diameter, sometimes septa visible, with branches or tubercular swellings. Numerous prisms of calcium oxalate among the hyphae, mostly in octahedron cubes, regular double-conical octahedrons or irregular polyhedrons, 3 ~ 60 μm in diameter, up to 68 μm long, sometimes several crystals aggregated.（Fig 1, 2）

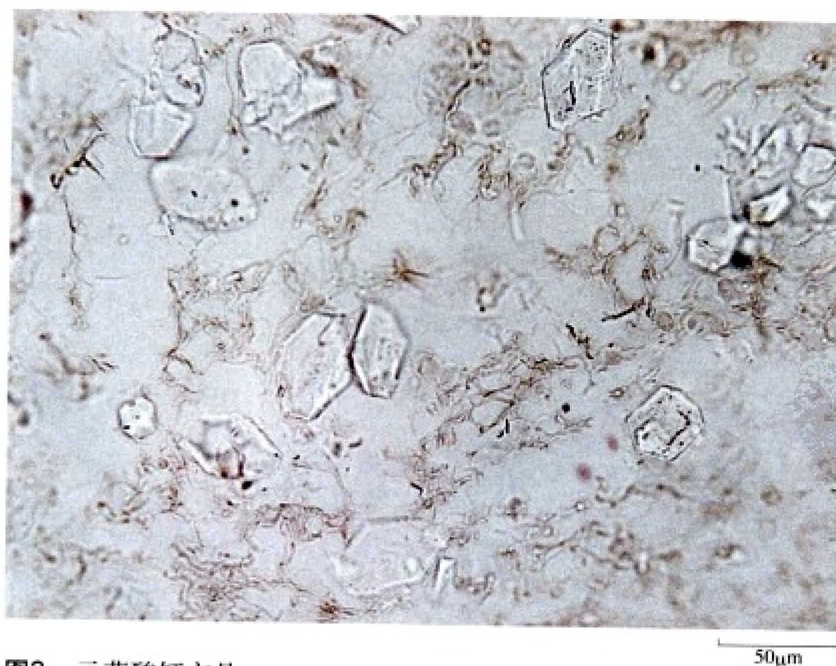


图2　示草酸钙方晶

[Fig2　Showing prisms of calcium oxalate]

猫 爪 草

Maozhaocao

RADIX RANUNCULI TERNATI

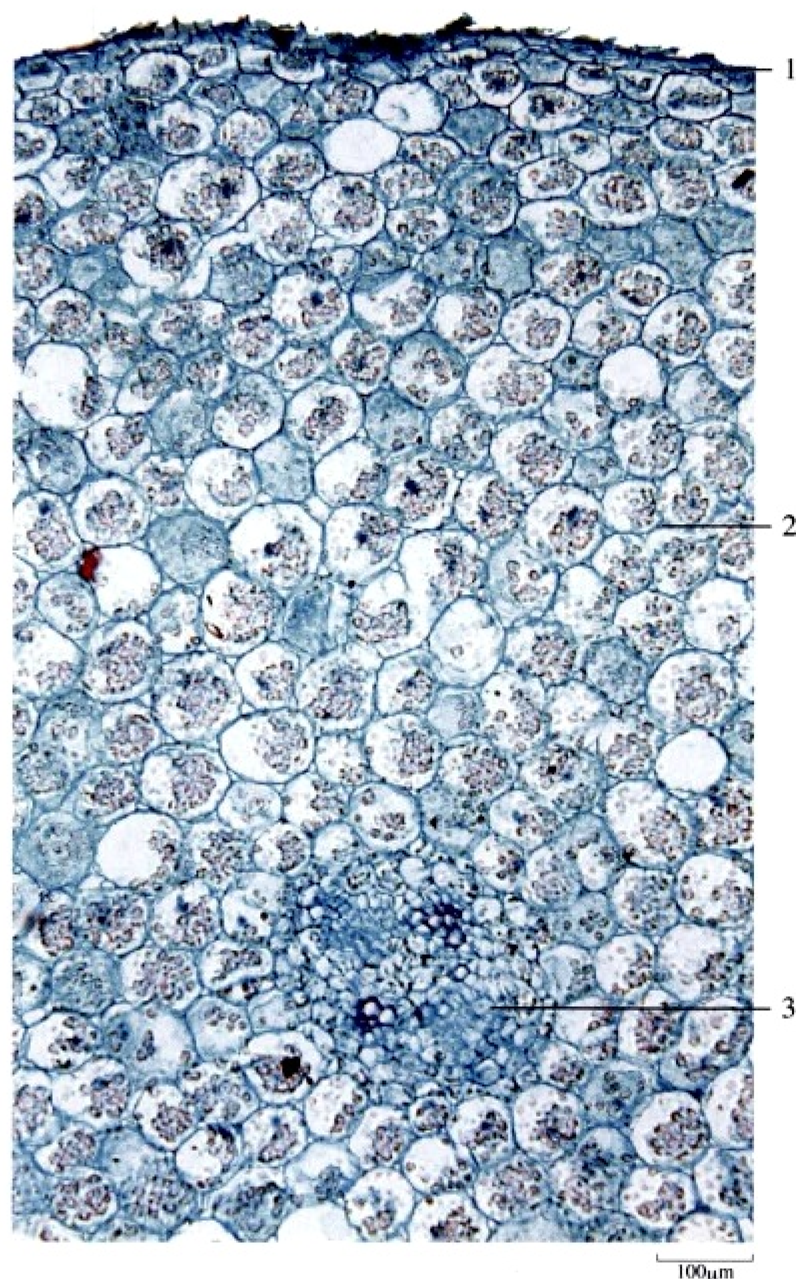


图1 猫爪草（*Ranunculus ternatus* 块根）横切面

[Fig1 Transverse section of tuber root from *Ranunculus ternatus*]

1. 表皮（Epidermis） 2. 皮层（Cortex） 3. 中柱（Stele）

本品为毛茛科植物小毛茛*Ranunculus ternatus* Thunb. 的干燥块根。

[显微特征]　本品横切面：表皮细胞切向延长，黄棕色，有的分化为表皮毛，微木化。皮层为20～30列细胞组成，壁稍厚，有纹孔；内皮层明显。中柱小，木质部、韧皮部各2～3束，间隔排列。薄壁细胞充满淀粉粒。（图1、2）

Transverse section: Epidermal cells tangentially elongated, yellowish-brown, some differentiated into epidermal hairs, slightly lignified. Cortex consisting of 20 ~ 30 layers of cells, walls slightly thickened and pitted; endodermis distinct. Stele small, xylem and phloem 2 ~ 3 bundles, respectively, arranged alternatively. Parenchymatous cells filled with starch granules. (Fig 1, 2)

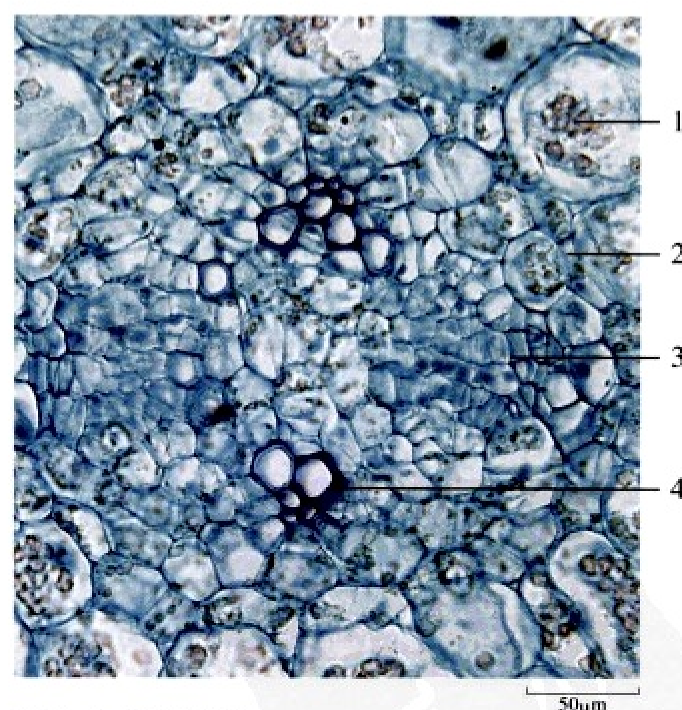


图2 中柱部分放大

[Fig2 Stele partially magnified]

1. 淀粉粒（Starch granules） 2. 内皮层（Endodermis） 3. 韧皮部束（Phloem bundle） 4. 木质部束（Xylem bundle）

麻　　黄

Mahuang

HERBA EPHEDRAE

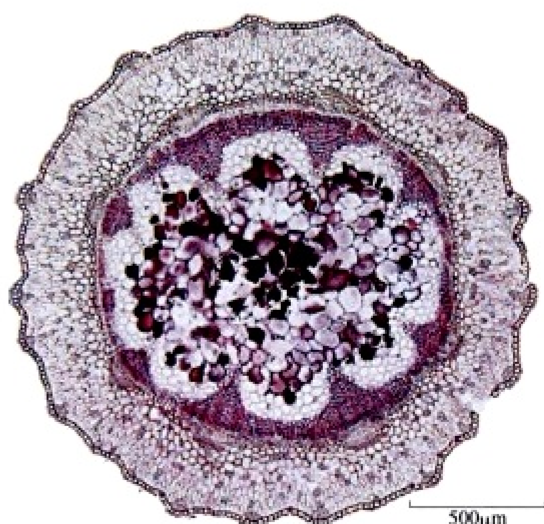


图1　草麻黄（*Ephedra sinica* 茎）横切面

[Fig1　Transverse section of stem from *Ephedra sinica*]

本品为麻黄科植物草麻黄*Ephedra sinica* Stapf、中麻黄*Ephedra intermedia* Schrenk et C. A. Mey. 或木贼麻黄*Ephedra equisetina* Bge. 的干燥草质茎。

[显微特征]　本品横切面：草麻黄　表皮细胞外被厚的角质层；脊线较密，有蜡质疣状突起，两脊线间有下陷气孔。下皮纤维束位于脊线处，壁厚，非木化。皮层较宽，纤维成束散在。中柱鞘纤维束新月形。维管束外韧型，8～10个。形成层环类圆形。木质部呈三角状。髓部薄壁细胞含棕色块；偶有环髓纤维。表皮细胞外壁、皮层薄壁细胞及纤维均有多数微小草酸钙砂晶或方晶。（图1、2）

Transverse section: *Ephedra sinica:* Epidermis covered with thick cuticle; ridges relatively dense, with waxy warty protrudings and sunken stomata located between two ridges. Hypodermal fibre bundles located in ridges, with thickened and unlignified walls. Cortex relatively broad, fibre bundles scattered. Pericycle fibre bundles crescent. Collateral vascular bundles 8 ~ 10. Cambium ring subrounded. Xylem triangular. Pith parenchymatous cells containing brown masses; occasionally showing perimedullary fibres. Outer walls of epidermal cells, cortex parenchymatous cells and fibres occurring numerous minute sand crystals or prisms of calcium oxalate. (Fig 1, 2)

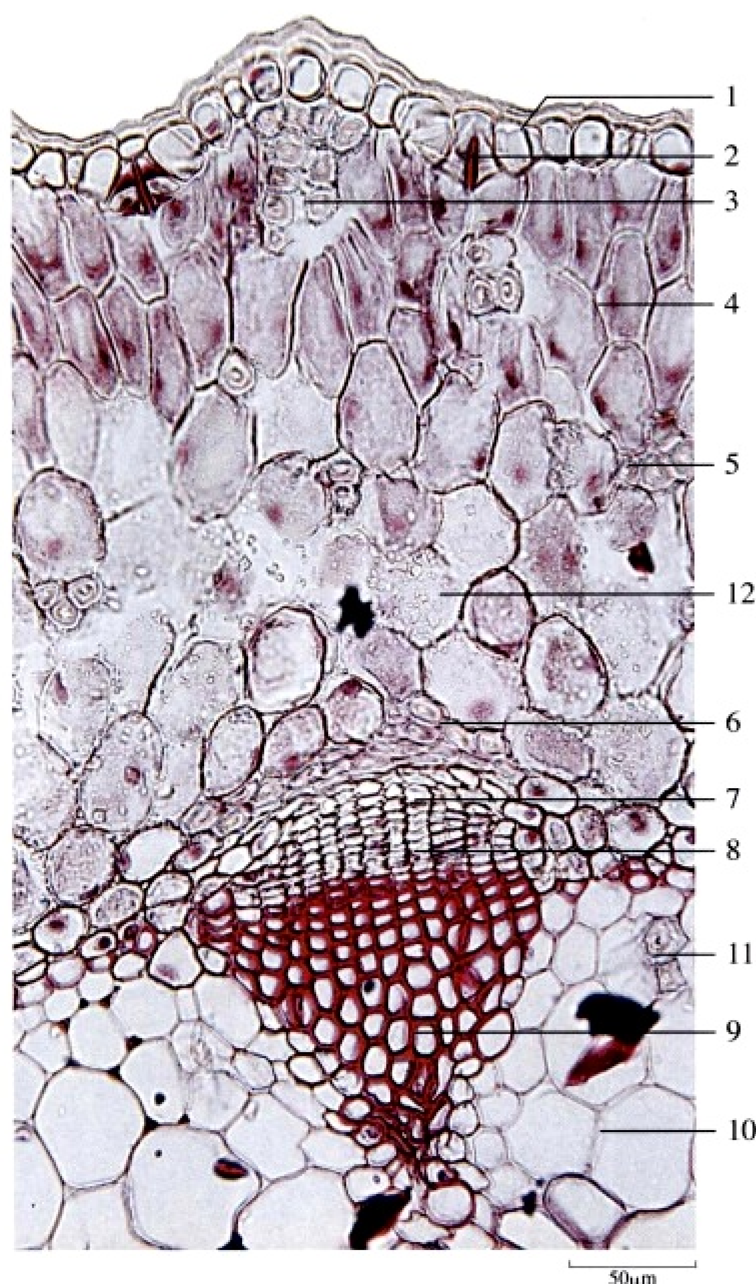


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 表皮（Epidermis）　2. 气孔（Stomata）　3. 下皮纤维（Hypodermal fibres）　4. 皮层（Cortex）　5. 皮层纤维（Cortex fibres）　6. 中柱鞘纤维束（Pericyclic fibre bundle）　7. 韧皮部（Phloem）　8. 形成层（Cambium）　9. 木质部（Xylem）　10. 髓（Pith）　11. 环髓纤维（Perimedullary fibres）　12. 草酸钙砂晶或方晶（Sand crystals or prisms of calcium oxalate）

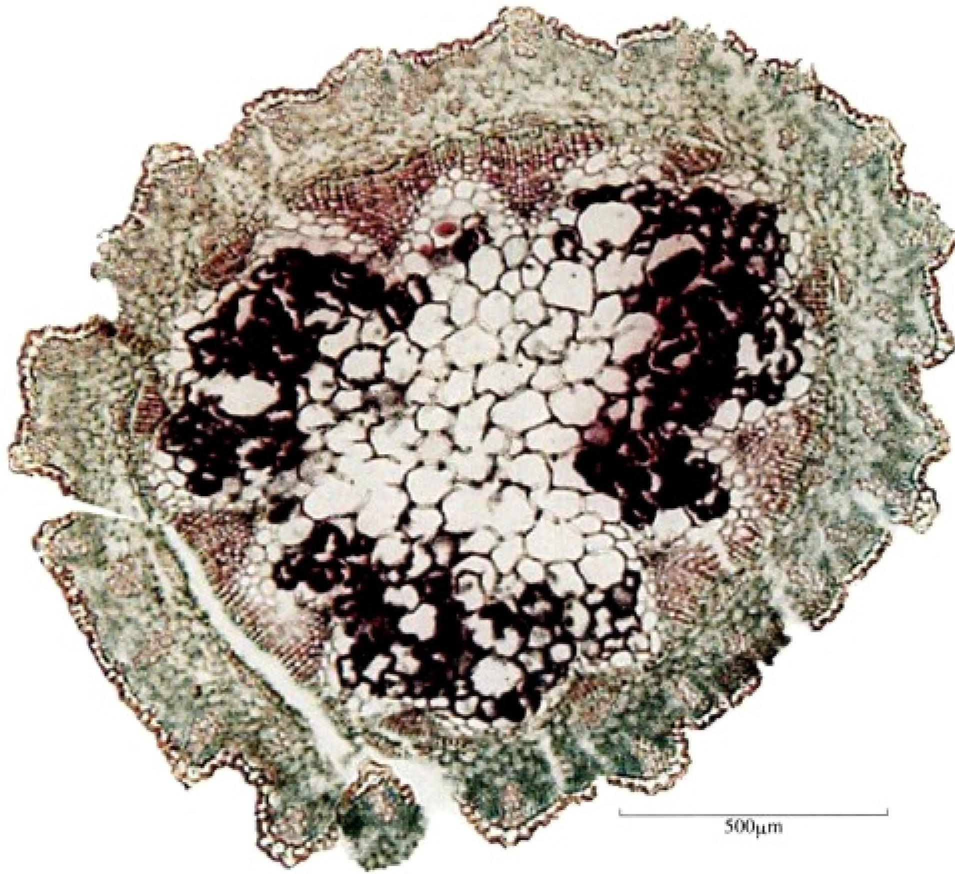


图3 麻黄（*Ephedra intermedia* 茎）横切面
[Fig3 Transverse section of stem from *Ephedra intermedia*]

中麻黄 维管束12～15个。形成层环类三角形。环髓纤维成束或单个散在。（图3）

Ephedra intermedia: Vascular bundles 12 ~ 15. Cambium ring subtriangular. Perimedullary fibres scattered in bundles or singly.（Fig 3）

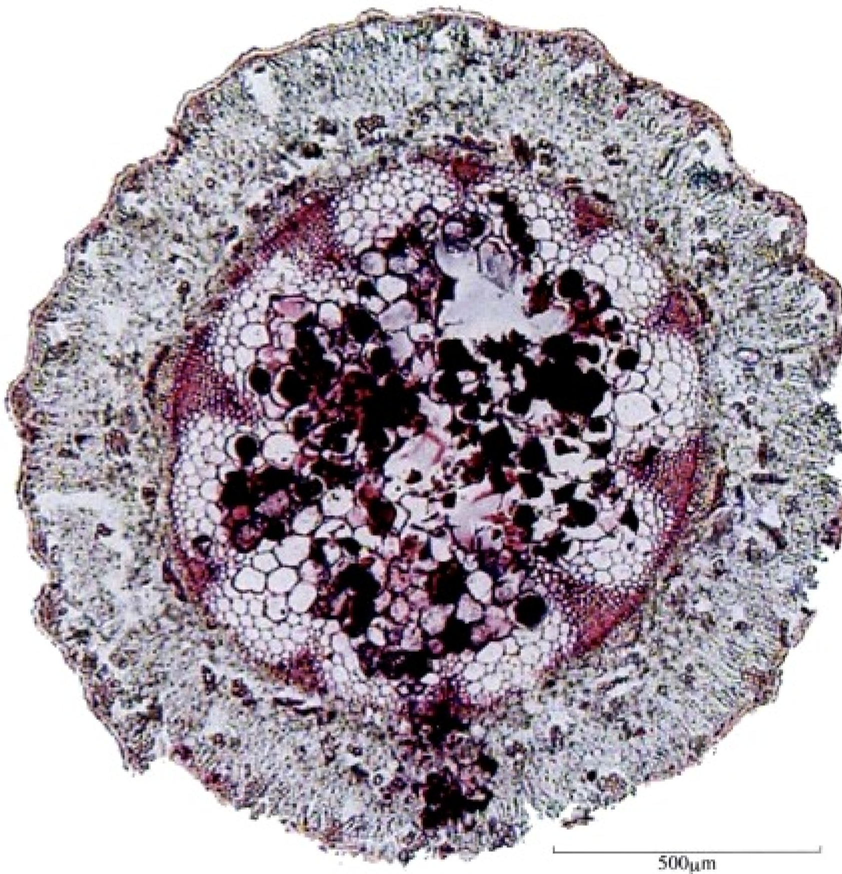


图4 麻黄（*Ephedra equisetina* 茎）横切面
[Fig4 Transverse section of stem from *Ephedra equisetina*]

木贼麻黄 维管束8～10个。形成层环类圆形。无环髓纤维。（图4）

Ephedra equisetina: Vascular bundles 8 ~ 10. Cambium ring subrounded. Perimedullary fibres absent.（Fig 4）

麻 黄 根

Mahuanggen

RADIX ET RHIZOMA EPHEDRAE

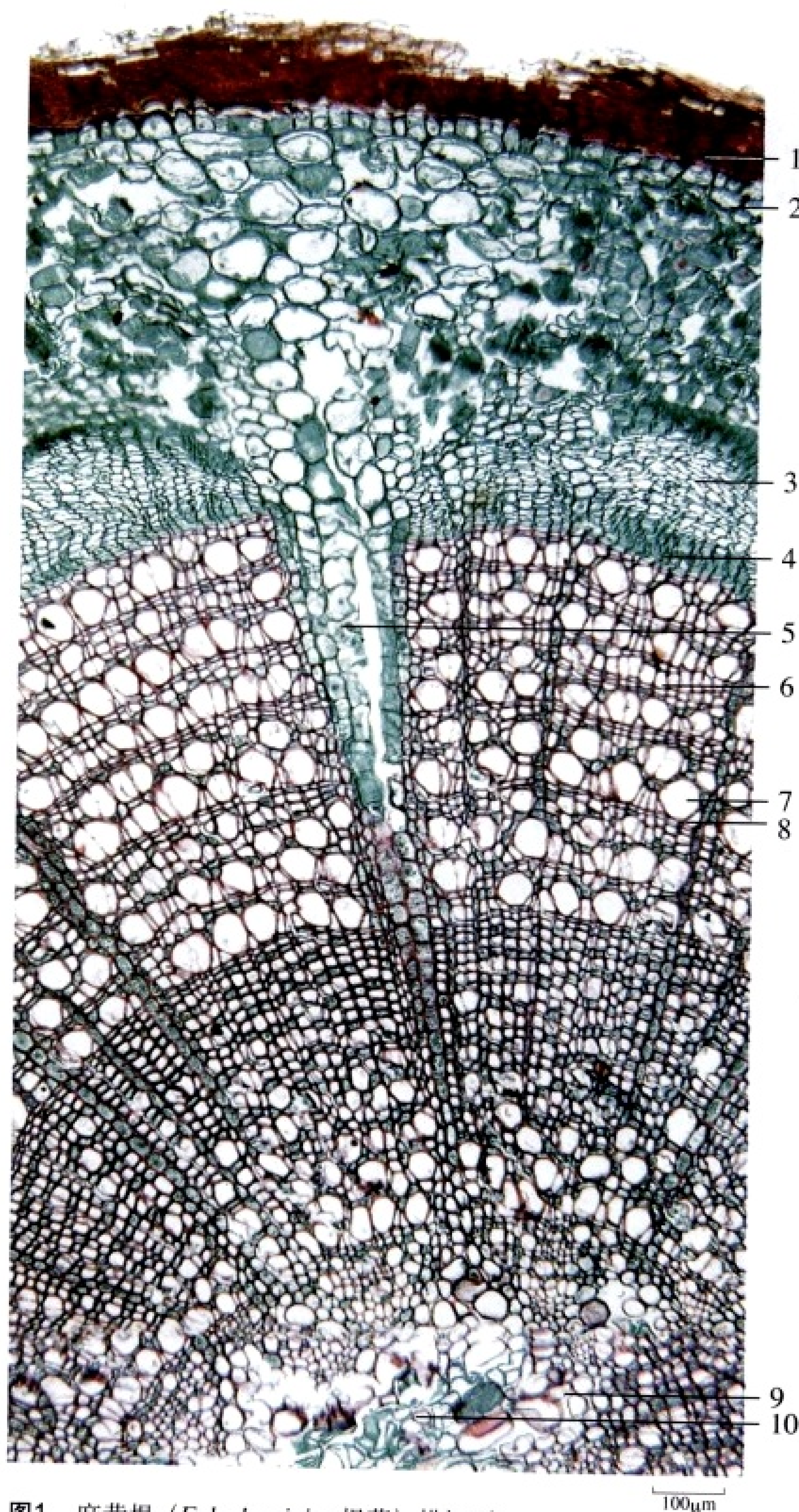


图1 麻黄根（*Ephedra sinica* 根茎）横切面

[Fig1 Transverse section of rhizome from *Ephedra sinica*]

1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 韧皮部（Phloem）
4. 形成层（Cambium） 5. 木射线（Xylem rays） 6. 木纤维（Xylem fibres）
7. 导管（Vessels） 8. 管胞（Tracheids） 9. 髓（Pith） 10. 纤维（Fibres）

本品为麻黄科植物草麻黄*Ephedra sinica* Stapf或中麻黄*Ephedra intermedia* Schrenk et C. A. Mey. 的干燥根及根茎。

[显微特征] **本品根的横切面**：木栓细胞10余列，其外有落皮层。栓内层为数列薄壁细胞，含草酸钙砂晶。中柱鞘由纤维及石细胞组成。韧皮部窄。形成层成环。木质部发达，由导管、管胞及木纤维组成；射线宽广，含草酸钙砂晶。有的髓部有纤维；薄壁细胞具纹孔。根茎的射线较窄。（图1、2）

Transverse section of root: Cork consisting of 10 or more layers of cells, with rhytidome outside. Phelloderm consisting of several layers of parenchymatous cells, containing sand crystals of calcium oxalate. Pericycle consisting of fibre bundles and stone cells. Phloem narrow. Cambium in a ring. Xylem well developed, consisting of vessels, tracheids and xylem fibres; rays broad, containing sand crystals of calcium oxalate. Sometimes pith with fibres; parenchymatous cells with pits. Rays of rhizome relatively narrow. (Fig 1, 2)

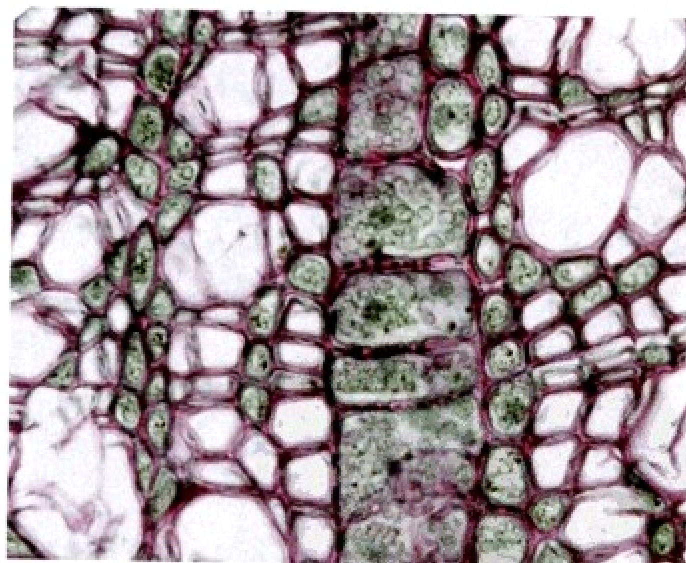


图2 示射线细胞含草酸钙砂晶

[Fig2 Showing ray cells containing sand crystals of calcium oxalate]

本品粉末：棕红色或棕黄色。木栓细胞呈长方形，棕色，含草酸钙砂晶。纤维多单个散在，直径20～25μm，壁厚，木化，斜纹孔明显。螺纹、网纹导管直径30～50μm，导管分子穿孔板上具多数圆形孔。石细胞有的可见，呈长圆形，类纤维状或有分枝，直径20～50μm，壁厚。髓部薄壁细胞类方形、类长方形或类圆形，壁稍厚，具纹孔。薄壁细胞含草酸钙砂晶。（图3）

Powder: Brownish-red or brownish-yellow. Cork cells rectangular, brown, containing sand crystals of calcium oxalate. Most fibres scattered singly, 20 ~ 25 μm in diameter, walls thickened and lignified, with distinct oblique pits. Spiral and reticulated vessels 30 ~ 50 μm in diameter, the perforated plates of vessel members with numerous rounded pores. Sometimes stone cells visible, oblong, fibrous or branched, 20 ~ 50 μm in diameter, thick walled. Parenchymatous cells in pith subsquare, subrectangular or subrounded, walls slightly thickened, with pits. Parenchymatous cells containing sand crystals of calcium oxalate.（Fig 3）



图3 麻黄根（*Ephedra sinica* 根）粉末

[Fig3 Powder of root from *Ephedra sinica*]

1. 木栓层（Cork） 2. 纤维（Fibres） 3. 导管（Vessels） 4. 石细胞（Stone cells） 5. 髓薄壁细胞（Parenchymatous cells in pith） 6. 草酸钙砂晶（Sand crystals of calcium oxalate）

鹿衔草

Luxiancao

HERBA PYROLAE

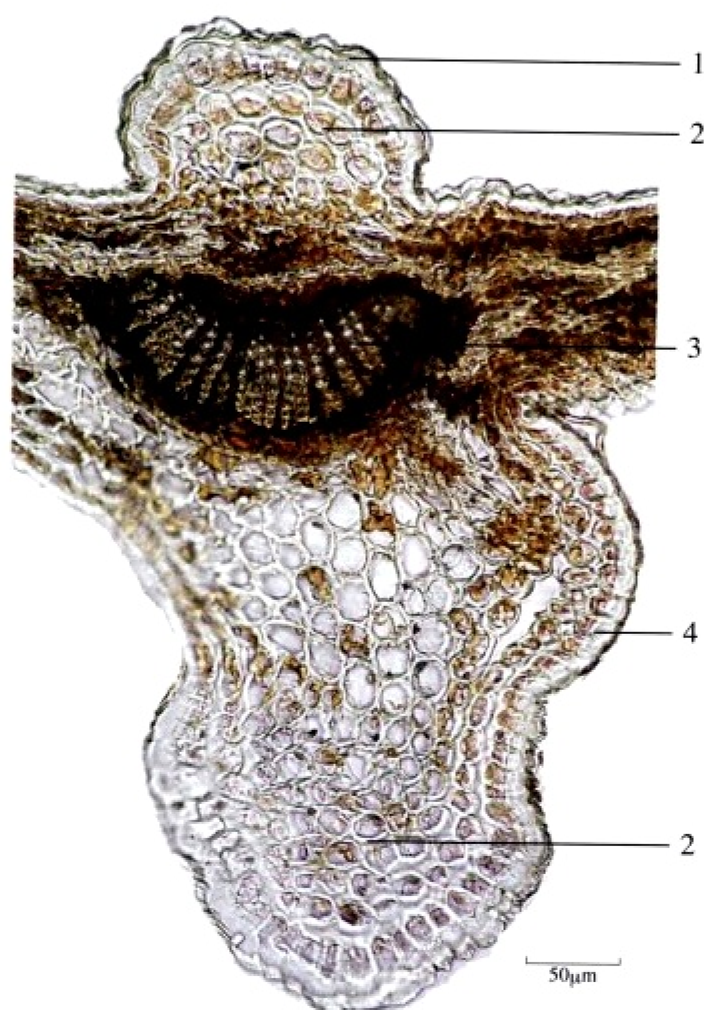


图1 鹿衔草（*Pyrola calliantha* 叶）横切面

[Fig1 Transverse section of leaf from *Pyrola calliantha*]

1. 上表皮（Upper epidermis） 2. 厚角细胞（Collenchymatous cells）
3. 主脉维管束（Vascular bundles of midrib） 4. 下表皮（Lower epidermis）

本品为鹿蹄草科植物鹿蹄草*Pyrola calliantha* H. Andres 或普通鹿蹄草*Pyrola decorata* H. Andres 的干燥全草。

[显微特征]　本品叶的横切面： 上、下表皮细胞类方形，外被角质层。下表皮可见气孔，内方具厚角细胞5～7列，上表皮内方有厚角细胞1～3列。栅栏细胞不明显，海绵细胞类圆形，含草酸钙簇晶。主脉维管束外韧型，木质部呈新月形，韧皮部窄，薄壁细胞含红棕色或棕黄色物质。（图1～3）

Transverse section of leaf: Epidermal cells of the upper and lower epidermis subsquare, covered with cuticle layer. Stomata visible on the lower epidermis, 5～7 layers of collenchymatous cells occurring on the inner side of lower epidermis, and 1～3 layers of that on the inner side of upper epidermis. Palisade cells indistinct, spongy cells subrounded, containing clusters of calcium oxalate. The vascular bundle of midrib collateral, xylem crescent, phloem narrow, parenchymatous cells containing reddish-brown or brownish-yellow substances.（Fig 1～3）

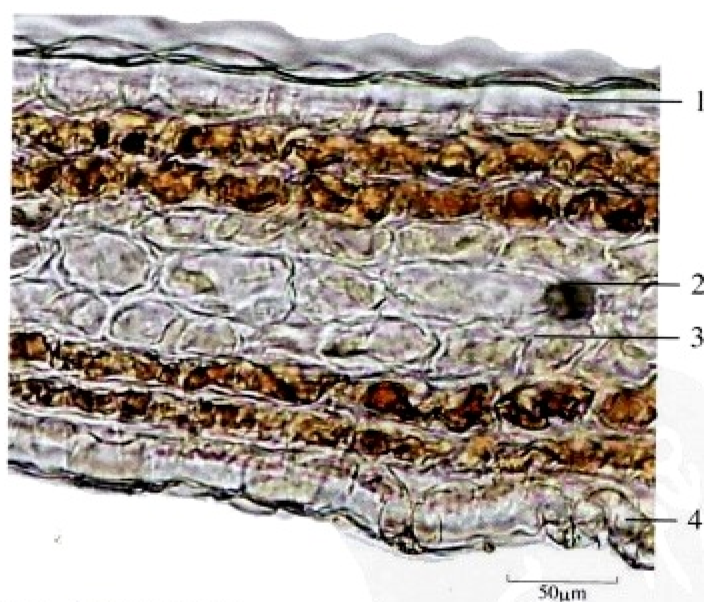


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 上表皮细胞（Upper epidermal cells） 2. 草酸钙簇晶（Clusters of calcium oxalate） 3. 海绵细胞（Spongy cells） 4. 下表皮细胞（Lower epidermal cells）

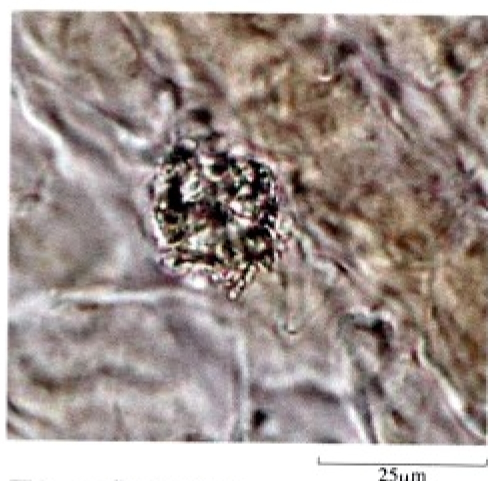


图3 示草酸钙簇晶

[Fig3 Showing clusters of calcium oxalate]

商　　陆

Shanglu

RADIX PHYTOLACCAE

本品为商陆科植物商陆*Phytolacca acinosa* Roxb. 或垂序商陆*Phytolacca americana* L. 的干燥根。

[显微特征]　本品横切面：商陆　木栓细胞数列至10余列。栓内层较窄。维管组织为三生构造，有数层同心性形成层环，每环有几十个维管束。维管束外侧为韧皮部，内侧为木质部；木纤维较多，常数个相连或围于导管周围。薄壁细胞含草酸钙针晶束，有时可见草酸钙方晶或簇晶，并含淀粉粒。(图1、2)

Transverse section *Phytolacca acinosa:* Cork consisting of several to 10 or more layers of cells. Phelloderm narrow. Fibro-vascular tissue forming tertiary structure, with several concentric cambium rings, each having dozens of vascular bundles. Phloem at the outer side of vascular bundles, xylem at the inner side, xylem fibres numerous, often several grouped or around the vessels. Parenchymatous cells containing raphides of calcium oxalate, a few containing prisms or clusters of calcium oxalate, also containing starch granules. (Fig 1, 2)

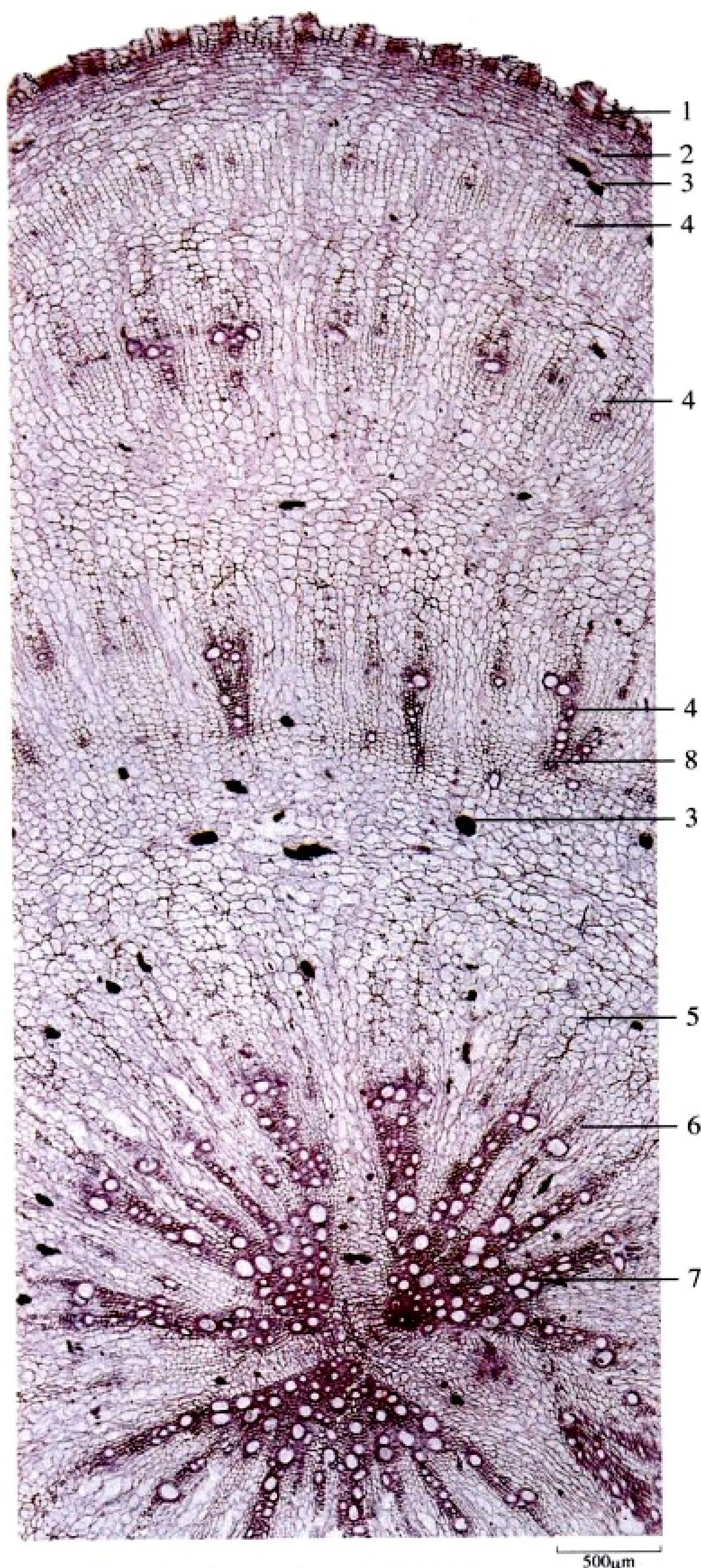


图1　商陆（*Phytolacca acinosa* 根）横切面

[Fig1　Transverse section of root from *Phytolacca acinosa*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 草酸钙针晶束（Raphides of calcium oxalate）　4. 三生维管束（Tertiary vascular bundles）　5. 次生韧皮部（Phloem of secondary vascular bundles）　6. 次生形成层（Cambium of secondary vascular bundles）　7. 次生木质部（Xylem of secondary vascular bundles）　8. 木纤维（Xylem fibres）

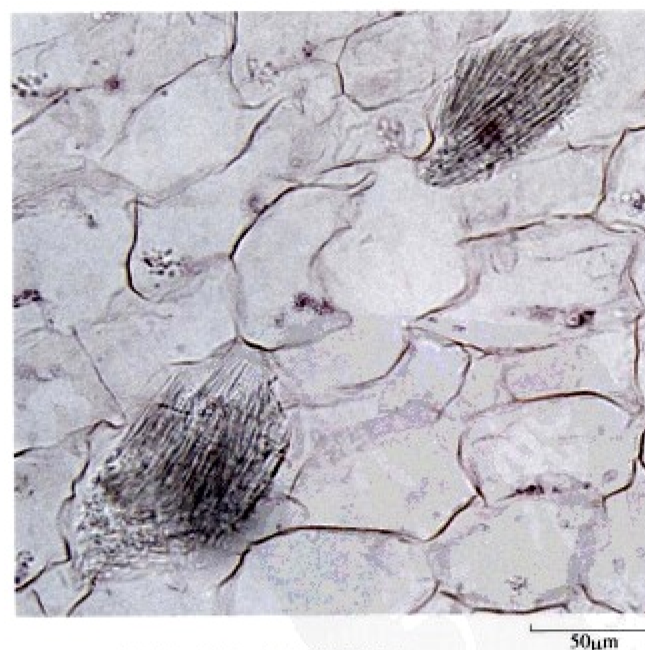


图2　示薄壁细胞含草酸钙针晶束

[Fig2　Showing parenchymatous cells containing raphides of calcium oxalate]

本品粉末：灰白色。草酸钙针晶成束或散在，针晶纤细，针晶束长40～72μm，尚可见少数草酸钙方晶。木纤维多成束，直径10～20μm，壁厚或稍厚，有多数十字形纹孔。木栓细胞棕黄色，长方形或多角形，有的含颗粒状物。淀粉粒单粒类圆形或长圆形，直径3～28μm，脐点短缝状、点状、星状或人字形，层纹不明显；复粒少数，由2～3分粒组成。（图3）

垂序商陆 草酸钙针晶束稍长，约至96μm；无方晶和簇晶。

Powder: Greyish-white. Needle crystals of calcium oxalate in bundles or scattered throughout, needle crystals fine, raphides 40～72 μm long; prisms of calcium oxalate observed. Xylem fibres mostly in bundles, 10～20 μm in diameter, walls thickened or slightly thickened with numerous X-shaped pits. Cork cells brownish-yellow, rectangular or polygonal, some containing granules. Starch granules simple, subrounded or oblong, 3～28 μm in diameter, hilum cleft-like, pointed, stellate and V-shaped, striations indistinct; compound granules rare, of 2～3 components.（Fig 3）

Phytolacca americana: Raphides of calcium oxalate relatively long, up to 96 μm; prisms and clusters absent.



图3 商陆（*Phytolacca acinosa* 根）粉末

[Fig3 Powder of root from *Phytolacca acinosa*]

1. 草酸钙针晶（Raphides of calcium oxalate） 2. 草酸钙方晶（Prisms of calcium oxalate） 3. 木纤维（Xylem fibres） 4. 木栓细胞（Cork cells） 5. 淀粉粒（Starch granules）

旋 覆 花

Xuanfuhua

FLOS INULAE

本品为菊科植物旋覆花*Inula japonica* Thunb. 或欧亚旋覆花*Inula britannica* L. 的干燥头状花序。

[显微特征]　**本品粉末**：棕黄色。苞片非腺毛1～8细胞，多细胞者基部膨大，顶端细胞特长；内层苞片另有2～3细胞并生的非腺毛。冠毛为多列性非腺毛，边缘细胞稍向外突出。子房表皮细胞含草酸钙柱晶，长约至48μm，直径2～5μm；子房非腺毛2列性，1列为单细胞，另列通常2细胞，长90～220μm。苞片、花冠腺毛棒槌状，头部多细胞，多排列成2列，围有角质囊，柄部多细胞，2列。花粉粒类球形，直径22～33μm，外壁有刺，长约3μm，具3个萌发孔。（图1）

Powder: Brownish-yellow. Non-glandular hairs of bracts 1～8 celled, the multicellular ones swollen at basal region and apical cell especially long; the inner bracts bearing 2～3 seriated non-glandular hairs. Pappus consisting of multiseriate non-glandular hairs, margin cells slightly convex. Epidermal cells of ovary containing cylindrical crystals of calcium oxalate, up to 48 μm long, 2～5 μm in diameter; non-glandular hairs of ovary biserrated, one unicellular and the other often bicellular, 90～220 μm long. Glandular hairs of bracts and corolla clavate, heads multicellular, mostly biseriate, covered with cuticle sac; stalks multicellular, biseriate. Pollen grains subspherical, 22～33 μm in diameter, exine spiny, about 3 μm long, with 3 germinal pores.（Fig 1）



图1　旋覆花（*Inula japonica* 花序）粉末

[Fig1　Powder of inflorescence from *Inula japonica*]

1. 苞片非腺毛（Non-glandular hairs of bracts）　2. 内层苞片非腺毛（Non-glandular hairs of inner bracts）　3. 冠毛非腺毛（Non-glandular hairs of pappus）　4. 子房表皮细胞（Epidermal cells of ovary）　5. 子房非腺毛（Non-glandular hairs of ovary）　6. 腺毛（Glandular hairs）　7. 花粉粒（Pollen grains）

羚 羊 角

Lingyangjiao

CORNU SAIGAE TATARICAE

本品为牛科动物赛加羚羊*Saiga tatarica* Linnaeus 的角。

[显微特征] **本品横切面**：可见组织构造多少呈波浪状起伏。角顶部组织波浪起伏最为明显，在峰部往往有束存在，束多呈三角形；角中部稍呈波浪状，束多呈双凸透镜形；角基部波浪形不明显，束呈椭圆形至类圆形。髓腔的大小不一，长径10～50（80）μm，以角基部的髓腔最大。束的皮层细胞扁梭形，3～5层。束间距离较宽广，充满着近等径性多边形、长菱形或狭长形的基本角质细胞。皮层细胞或基本角质细胞均无色透明，其中不含或仅含少量细小浅灰色色素颗粒，细胞中央往往可见一个折光性强的圆粒或线状物。（图1、2）

Transverse section: Somewhat undulated. The most obvious undulation at the apical part, usually with bundles in peaks; bundles mostly triangular; slightly undulate in the middle part, bundles mostly like a double convex lens; undulation indistinct in the basal part, bundles elliptical to subrounded. Medullary cavities varying in size, 10～50（80） μm in long diameter, largest in the basal part. Cortical cells of the bundles flattened shuttle shaped, in 3～5 layers. Intervals between bundles relatively wide, filled with subisodiameteric polygonal, elongate rhombic or narrow elongated basic horny cells. Both of the cortical cells or basic horny cells colourless, transparent, without or only with a few minute pale grey pigment granules, with a strong refractive round granule or thread like substance in centre of cells.(Fig 1, 2)

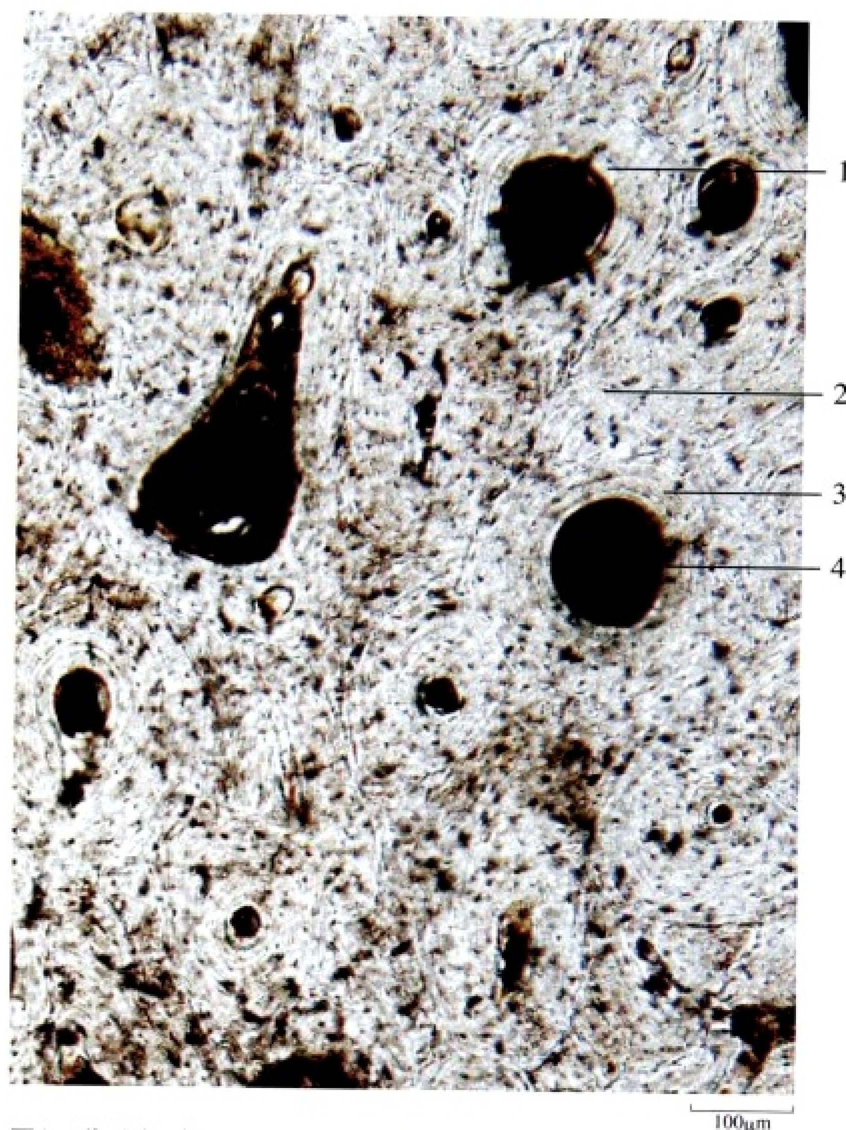


图1　羚羊角（*Saiga tatarica* 角）横切面

[Fig1　Transverse section of horn from *Saiga tatarica*]

1. 束（Bundles）　2. 皮层细胞（Cortical cells）　3. 基本角质细胞（Basic horny cells）　4. 髓腔（Medullary cavities）

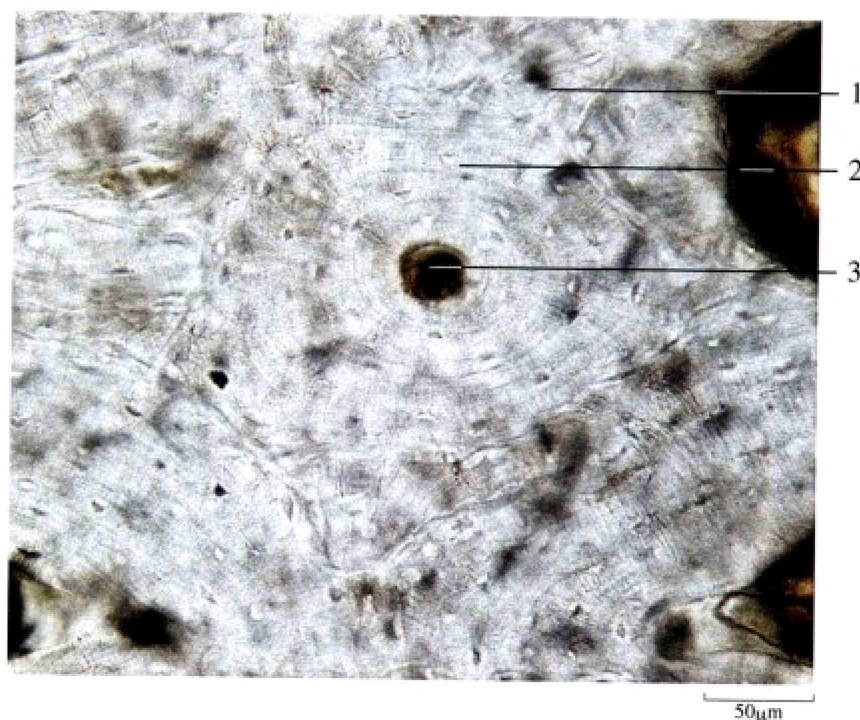


图2　一个束放大

[Fig2　A bundle magnified]

1. 皮层细胞（Cortical cells）　2. 基本角质细胞（Basic horny cells）　3. 髓腔（Medullary cavities）

断　血　流

Duanxueliu

HERBA CLINOPODII

本品为唇形科植物荫风轮*Clinopodium polycephalum*（Vaniot）C. Y. Wu et Hsuan或风轮菜*Clinopodium chinensis*（Benth.）O. Kuntze 的干燥地上部分。

[显微特征]　**本品叶的表面观：**下表皮细胞垂周壁呈波状，气孔直轴式。非腺毛细长，众多，由1～9细胞组成，长至1440μm，有的基部细胞膨大，直径至102μm；中部细胞直径10～55μm，有的细胞呈缢缩状，表面具疣状突起。腺鳞头部7～11细胞，直径至60μm，柄单细胞，极短。小腺毛头部、柄均为单细胞，头部直径约20μm。（图1）

Surface view of leaf: Anticlinal walls of lower epidermal cells sinuous, stomata diacytic. Non-glandular hairs slender, numerous, 1～9 celled, up to 1440 μm long, some basal cells expanded, up to 102 μm in diameter, cells of the middle part 10～55 μm in diameter, some cells constricted and with warty prominences on the surface. Glandular scales each with a 7～11 celled head, up to 60 μm in diameter, an unicellular stark, extremely short. Small glandular hairs each with an unicellular heads and an unicellular stark, heads about 20 μm in diameter.（Fig 1）



图1　断血流（*Clinopodium polycephalum* 叶）表面观

[Fig1　Surface view of leaf from *Clinopodium chinensis*]

1. 下表皮细胞及气孔（Lower epidermal cells and stomata）　2. 非腺毛（Non-glandular hairs）　3. 腺鳞（Glandular scales）
4. 小腺毛（Small glandular hairs）

淡 竹 叶

Danzhuye

HERBA LOPHATHERI

本品为禾本科植物淡竹叶 *Lophatherum gracile* Brongn. 的干燥茎叶。

[显微特征] 本品叶的表面观：上表皮细胞长方形或类方形，垂周壁波状弯曲，其下可见圆形栅栏细胞。下表皮长细胞与短细胞交替排列或数个相连，长细胞长方形，垂周壁波状弯曲；短细胞为短哑铃形的硅质细胞和类方形的栓质细胞，于叶脉处短细胞成串；气孔较多，保卫细胞哑铃形，副卫细胞近圆三角形。非腺毛有三种：一种为单细胞长非腺毛；一种为单细胞短非腺毛，呈短圆锥形；另一种为双细胞短小非腺毛，偶见。（图1）

Surface view of leaf: Epidermal cells of the upper epidermis rectangular or subsquare, with sinuous anticlinal walls, showing rounded palisade cells beneath. Long cells and short cells of lower epidermis alternately arranged or several connected; long cells rectangular, with sinuous anticlinal walls, short cells dumb-bell shaped, being silica cells and suberized cells, a bunch of short cells occurring near veins. Stomata numerous, guard cells dumb-bell shaped, subsidiary cells subrounded-triangular. Non-glandular hairs of three types: the first type long and unicellular; the secend type short conical and unicellular; the third type occasionally visible, bicellular, short and small. (Fig 1)



图1 淡竹叶（*Lophatherum gracile* 叶）表面观

[Fig1 Surface view of leaf from *Lophatherum gracile*]

1. 上表皮细胞（Upper epidermal cells） 2. 下表皮细胞（Lower epidermal cells） 3. 长非腺毛（Long non-glandular hairs） 4. 短非腺毛（Short non-glandular hairs）

密蒙花

Mimenghua

FLOS BUDDLEJAE

本品为马钱科植物密蒙花*Buddleja officinalis* Maxim. 的干燥花蕾及其花序。

[显微特征]　**本品粉末：**棕色非腺毛通常为4细胞，基部2细胞单列；上部2细胞并列，每细胞又分2叉，每分叉长50～500μm，壁甚厚，胞腔线形。花冠上表面有少数非腺毛，单细胞，长38～600μm，壁具多数刺状突起。花粉粒类球形，直径13～20μm，表面光滑，有3个萌发孔。腺毛头部顶面观（1～）2细胞，2细胞者并列呈哑铃形或蝶形；柄极短。（图1）

Powder: Brown. Non-glandular hairs usually 4-celled, at the base 2-celled, uniseriate; at the apex 2-celled, biseriate, each cell 2-forked, forks 50 ~ 500 μm long, walls extremely thick, lumina linear. Upper epidermis of corolla with a few non-glandular hairs, unicellular, 38 ~ 600 μm long, walls with numerous spiny emergences. Pollen grains globose, 13 ~ 20 μm in diameter, exine smooth, with 3 germinal pores. Glandular hair heads (1 ~) 2 celled in top surface view, 2 cells biseriated, dumbbell or butterfly shaped; stalks extremely short. (Fig 1)

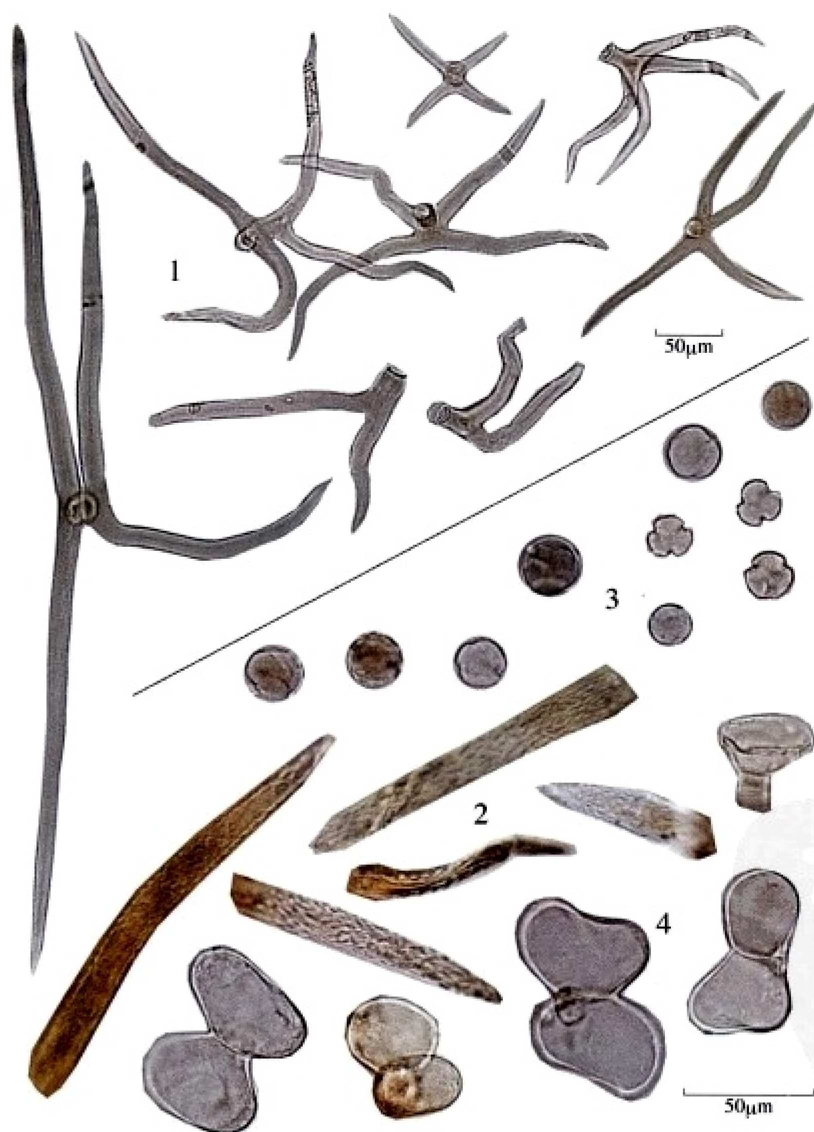


图1　密蒙花（*Buddleja officinalis* 花蕾）粉末

[Fig1　Powder of flowering bud from *Buddleja officinalis*]

1. 4细胞非腺毛（4-celled non-glandular hairs）　2. 单细胞非腺毛（Unicellular non-glandular hairs）　3. 花粉粒（Pollen grains）　4. 腺毛（Glandular hairs）

续　　断
Xuduan
RADIX DIPSACI

本品为川续断科植物川续断 *Dipsacus asperoides* C. Y. Cheng et T. M. Ai 的干燥根。

[显微特征]　本品横切面：木栓细胞数列。栓内层较窄。韧皮部筛管群稀疏散在。形成层环明显或不甚明显。木质部射线宽广，导管近形成层处分布较密，向内渐稀少，常单个散在或2～4个相聚。髓部小，细根多无髓。薄壁细胞含草酸钙簇晶。(图1、2)

Transverse section: Cork consisting of several layers of cells. Phelloderm narrow. Groups of sieve tubes sparsely scattered in phloem. Cambium ring distinct or less distinct. Xylem rays broad, vessels dense near cambium and sparse inwards, often singly scattered or 2 ~ 4 grouped. Pith small, and mostly absent in small roots. Parenchymatous cells containing clusters of calcium oxalate. (Fig 1, 2)

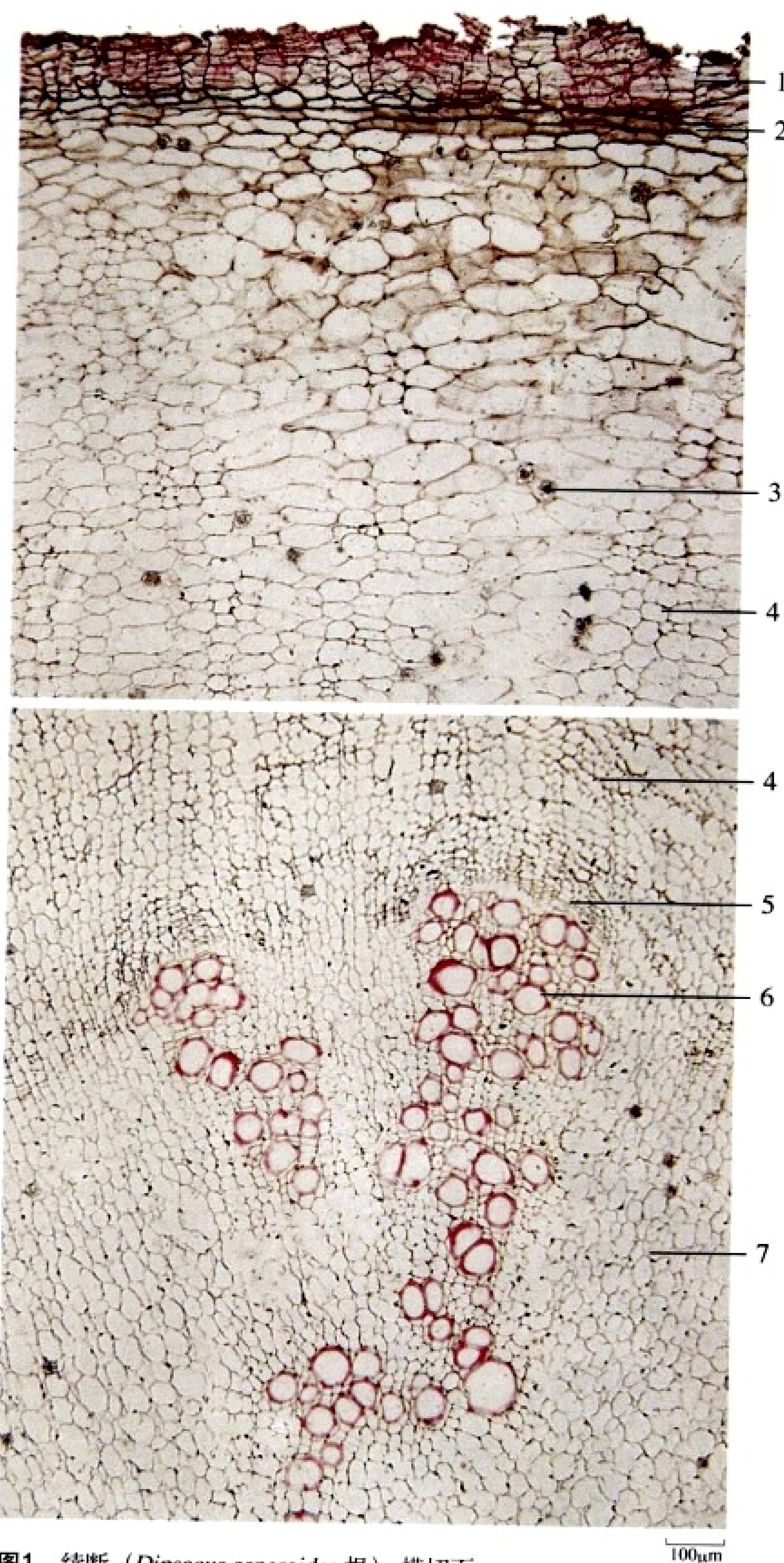


图1　续断（*Dipsacus asperoides* 根）横切面

[Fig1　Transverse section of root from *Dipsacus asperoides*]

1. 木栓层（Cork）　2. 栓内层（Phelloderm）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 韧皮部（Phloem）　5. 形成层（Cambium）　6. 木质部（Xylem）　7. 木射线（Xylem rays）

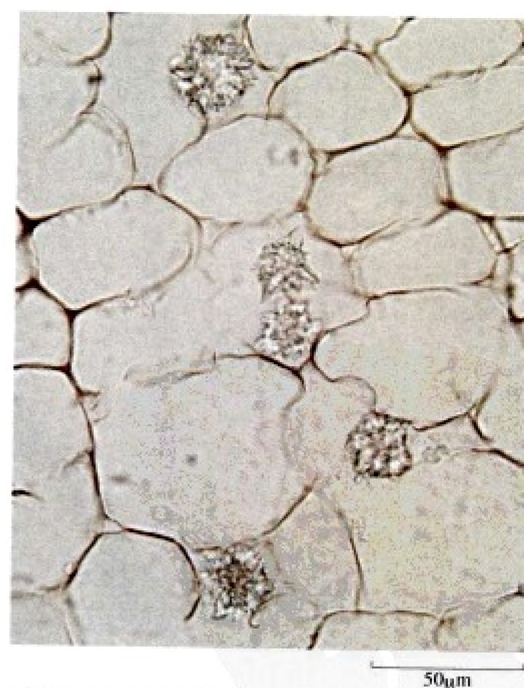


图2　示草酸钙簇晶

[Fig2　Showing clusters of calcium oxalate]

本品粉末：黄棕色。草酸钙簇晶甚多，直径15～50μm，散在或存在于皱缩的薄壁细胞中，有时数个排列成紧密的条状。纺锤形薄壁细胞壁稍厚，有斜向交错的细纹理。具缘纹孔及网纹导管直径约至72（90）μm。木栓细胞淡棕色，表面观类长方形、类方形、多角形或长多角形，壁薄。（图3）

Powder: Yellowish-brown. Clusters of calcium oxalate fairly abundant, 15～50 μm in diameter, scattered throughout or embedded in shrunken parenchymatous cells, sometimes several clusters arranged in a row. The walls of fusiform parenchymatous cells slightly thickened, with fine, oblique crisscross striations. Bordered pits and reticulated vessels up to 72 (90) μm in diameter. Cork cells pale brown, subrectangular, subsquare, polygonal or long-polygonal in surface view, with thin walls. (Fig 3)

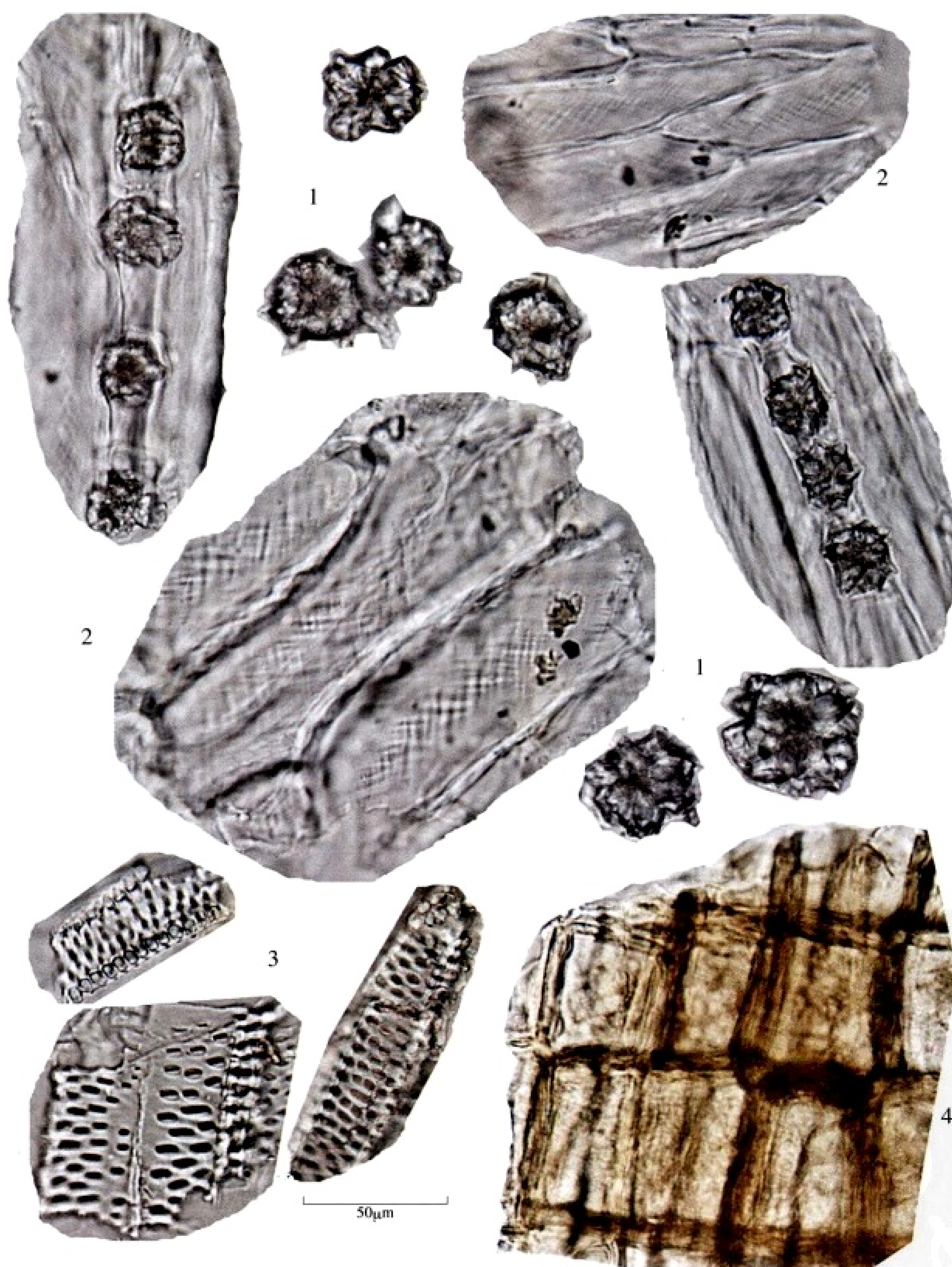


图3 续断（*Dipsacus asperoides* 根）粉末

[Fig3 Powder of root from *Dipsacus asperoides*]

1. 草酸钙簇晶（Clusters of calcium oxalate） 2. 纺锤形薄壁细胞（Fusiform parenchymatous cells） 3. 导管（Vessels）
4. 木栓细胞（Cork cells）

绵马贯众

Mianmaguanzhong

RHIZOMA DRYOPTERIDIS CRASSIRHIZOMATIS

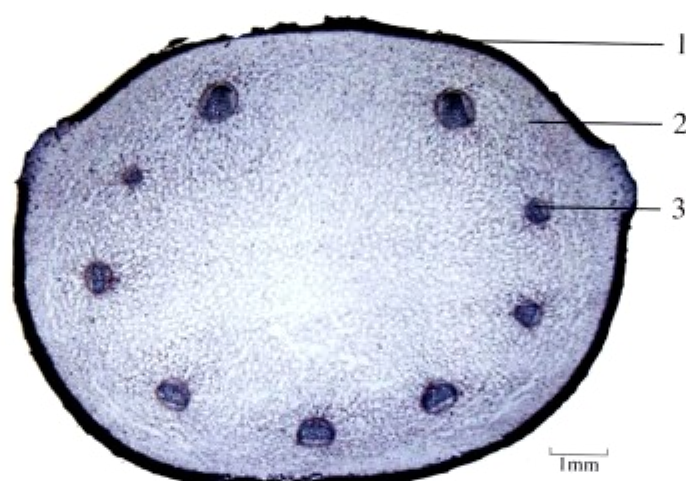


图1 绵马贯众（*Dryopteris crassirhizoma* 叶柄基部） 横切面
[Fig1 Transverse section of frond base from *Dryopteris crassirhizoma*]
1. 下皮（Hypodermis） 2. 基本组织（Ground tissue） 3. 周韧维管束（Amphicribral vascular bundles）

本品为鳞毛蕨科植物粗茎鳞毛蕨 *Dryopteris crassirhizoma* Nakai 的干燥根茎及叶柄残基。

[显微特征]　本品叶柄基部横切面：表皮为1列外壁增厚的小型细胞，常脱落。下皮为10余列多角形厚壁细胞，棕色至褐色。基本组织细胞排列疏松，细胞间隙中有单细胞的间隙腺毛，头部呈球形或梨形，内含棕色分泌物；周韧维管束5～13个，环列，每个维管束周围有1列扁小的内皮层细胞，凯氏点明显，有油滴散在，其外有1～2列中柱鞘薄壁细胞。薄壁细胞中含棕色物与淀粉粒。(图1～3)

Transverse section of frond base: Epidermis consisting of a layer of small cells with thickened outer walls, usually falling off. Hypodermal cells consisting of 10 or more layers of sclerenchymatous polygonal cells, brown to dark brown. Parenchymatous cells arranged loosely, having internal unicellular glandular hairs in intercellular spaces, heads spherical or pear-shaped, containing brown contents. Amphicribral vascular bundles 5～13, arranged in a ring, each bundle surrounded by a layer of oblate and small endodermis cells, casparian dots distinct and with oil drops scattered, the outside having 1～2 layers of pericycle parenchymatous cells. Parenchymatous cells containing brown contents and starch granules. (Fig 1～3)

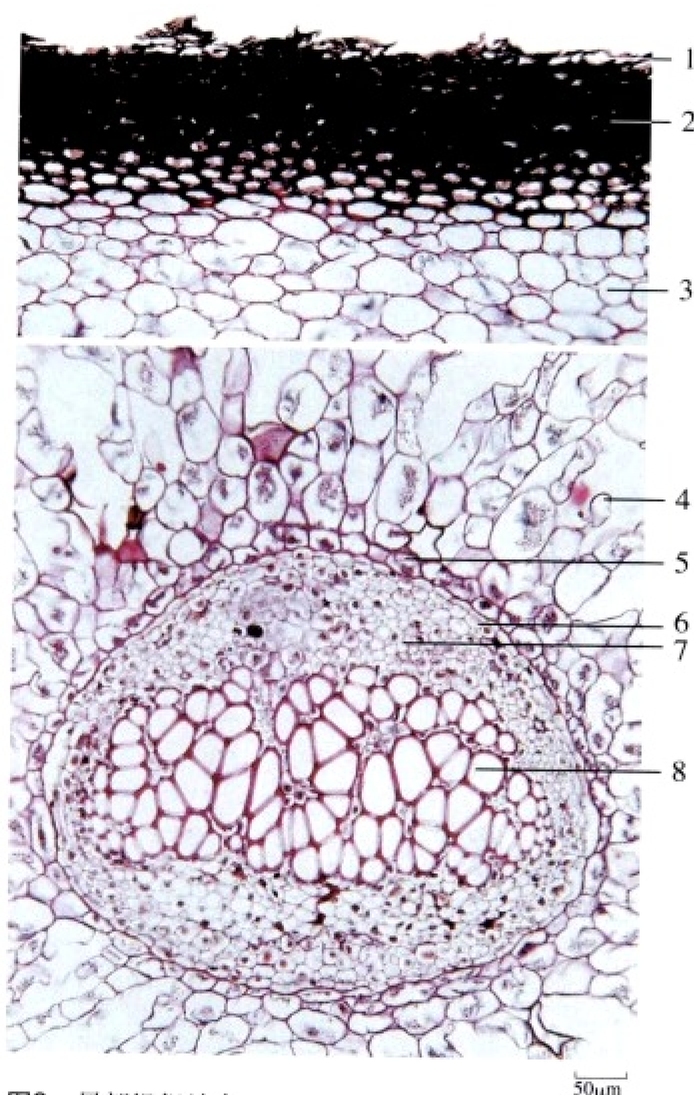


图2 局部组织放大
[Fig2 Partial tissue magnified]
1. 表皮（Epidermis） 2. 下皮（Hypodermis） 3. 基本组织（Ground tissue）
4. 间隙腺毛（Intercellular glandular hairs） 5. 内皮层（Endodermis）
6. 中柱鞘（Pericycle） 7. 韧皮部（Phloem） 8. 木质部管胞（Xylem tracheids）

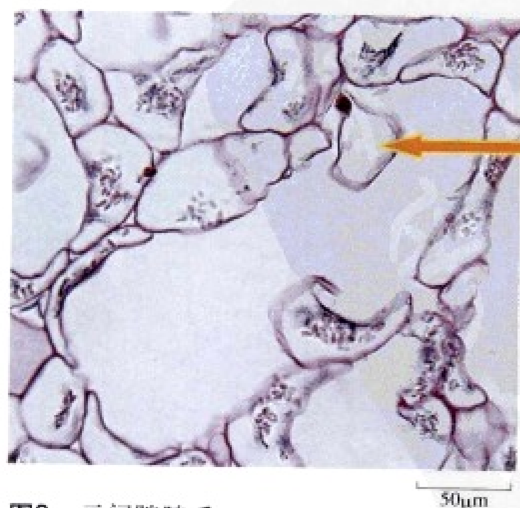


图3 示间隙腺毛
[Fig3 Showing intercellular glandular hairs]

绵 萆 薢

Mianbixie

RHIZOMA DIOSCOREAE SEPTEMLOBAE

本品为薯蓣科植物绵萆薢 *Dioscorea septemloba* Thunb. 或福州薯蓣*Dioscorea futschauensis* Uline ex R. Kunth 的干燥根茎。

[显微特征]　本品粉末：淡黄棕色。淀粉粒众多，单粒卵圆形、椭圆形、类圆形、类三角形或不规则形，有的一端尖突，有的呈瘤状，直径10～70μm，脐点裂隙状、人字状、点状，层纹大多不明显。草酸钙针晶多成束，长90～210μm。薄壁细胞壁略增厚，纹孔明显。具缘纹孔导管直径17～84μm，纹孔明显。木栓细胞棕黄色，多角形。（图1）

Powder: Pale yellowish-brown. Starch granules abundant, simple granules ovoid, ellipsoid, subspherical, triangular or irregular, some acuate at one end, some knotty, 10～70 μm in diameter, hilum cleft-like, V-shaped or pointed, striations mostly indistinct. Needle crystals of calcium oxalate mostly in bundles, 90～210 μm long. Parenchymatous cells with slightly thickened walls, pits distinct. Bordered pitted vessels 17～84 μm in diameter, pits distinct. Cork cells brownish-yellow and polygonal. (Fig 1)

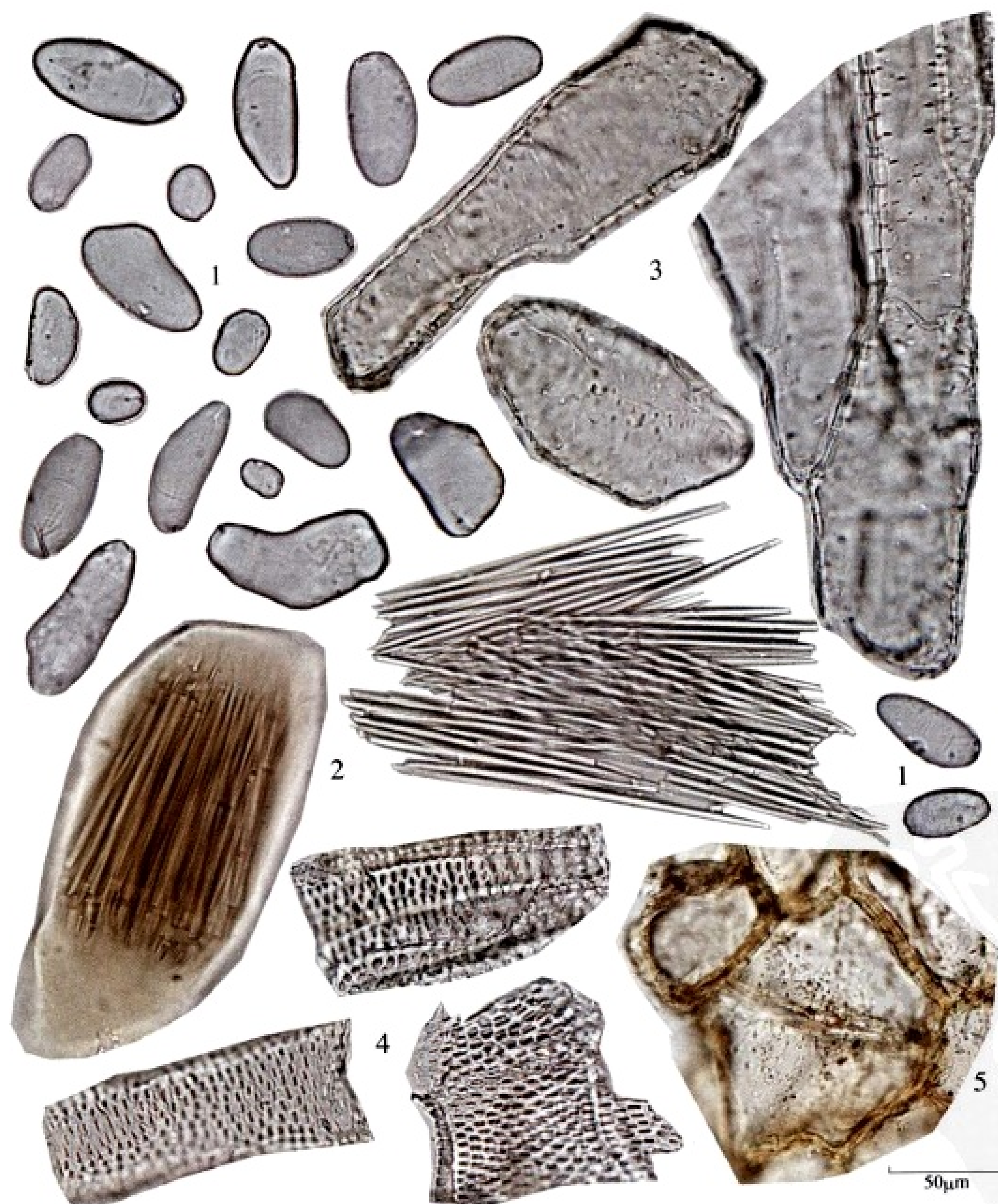


图1　绵萆薢（*Dioscorea septemloba* 根茎）粉末

[Fig1　Powder of rhizome from *Dioscorea septemloba*]

1. 淀粉粒（Starch granules）　2. 草酸钙针晶束（Raphides of calcium oxalate）　3. 薄壁细胞（Parenchymatous cells）　4. 具缘纹孔导管（Bordered pitted vessels）　5. 木栓细胞（Cork cells）

葛　根

Gegen

RADIX PUERARIAE LOBATAE

本品为豆科植物野葛*Pueraria lobata*（Willd.）Ohwi 的干燥根。

[显微特征]　本品粉末：淡棕色。淀粉粒单粒球形，直径3～37μm，脐点点状、裂缝状或星状；复粒由2～10分粒组成。纤维多成束，壁厚，木化，周围细胞大多含草酸钙方晶，形成晶纤维，含晶细胞壁木化增厚。石细胞少见，类圆形或多角形，直径38～70μm。具缘纹孔导管较大，具缘纹孔六角形或椭圆形，排列极为紧密。（图1）

Powder: Pale brown. Simple starch granules spheroidal, 3 ~ 37 μm in diameter, hilum pointed, cleft or stellate; compound granules of 2 ~ 10 components. Fibres mostly in bundles, walls thickened and lignified, surrounded by cells mostly containing prisms of calcium oxalate, forming crystal fibres; crystal cells with lignified and thickened walls. Stone cells infrequently visible, subrounded or polygonal, 38 ~ 70 μm in diameter. Bordered pitted vessels relatively large, pits hexagonal or elliptical, arranged very densely. （Fig 1）

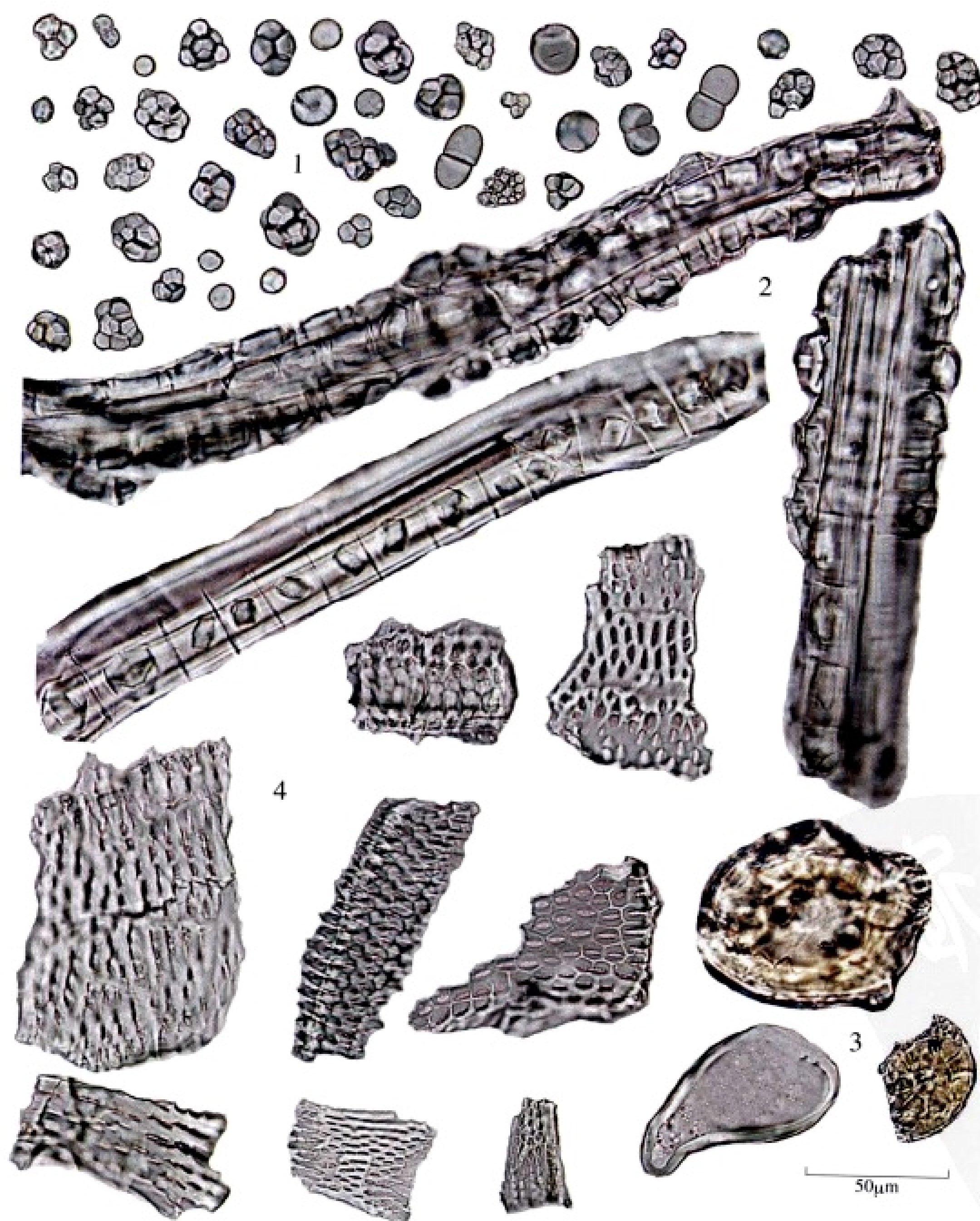


图1　葛根（*Pueraria lobata* 根）粉末

[Fig1　Powder of root from *Pueraria lobata*]

1. 淀粉粒（Starch granules）　2. 晶纤维（Crystal fibres）　3. 石细胞（Stone cells）　4. 具缘纹孔导管（Bordered pitted vessels）

葶 苈 子

Tinglizi

SEMEN LEPIDII
SEMEN DESCURAINIAE

本品为十字花科植物独行菜*Lepidium apetalum* Willd. 或播娘蒿 *Descurainia sophia* （L.） Webb ex Prantl 的干燥成熟种子。

［显微特征］ 本品粉末：北葶苈子 黄棕色。种皮表皮细胞为黏液细胞，侧面观略呈长方形，内壁增厚向外延伸成纤维素柱，纤维素柱长24～34μm，顶端钝圆、偏斜或平截，周围可见黏液质纹理。种皮内表皮细胞为黄色，表面观呈多角形、类方形，少数长多角形，直径15～42μm，壁厚5～8μm。（图1）

南葶苈子 种皮外表皮细胞侧面观类方形，纤维素柱短，长8～18μm，种皮内表皮细胞表面观长方多角形。（图1）

Powder: *Lepidium apetalum* Yellowish-brown. Epidermal cells of testa consisting of mucilage cells, rectangular in lateral view, thickened inner-walls extending outwards to cellulose columns, 24 ~ 34μm long, obtuse-rounded, oblique or truncate at apex, mucilage striations visible in periphery. Inner epidermal cells of testa yellow, polygonal or subsquare, some long-polygonal in surface view, 15 ~ 42μm in diameter, walls 5 ~ 8μm thick. (Fig 1)

Lepidium sophia Outer epidermal cells of testa subsquare in lateral view, cellulose column short, 8 ~ 18μm long, inner epidermal cells of testa rectangular-polygonal in surface view. (Fig 1)

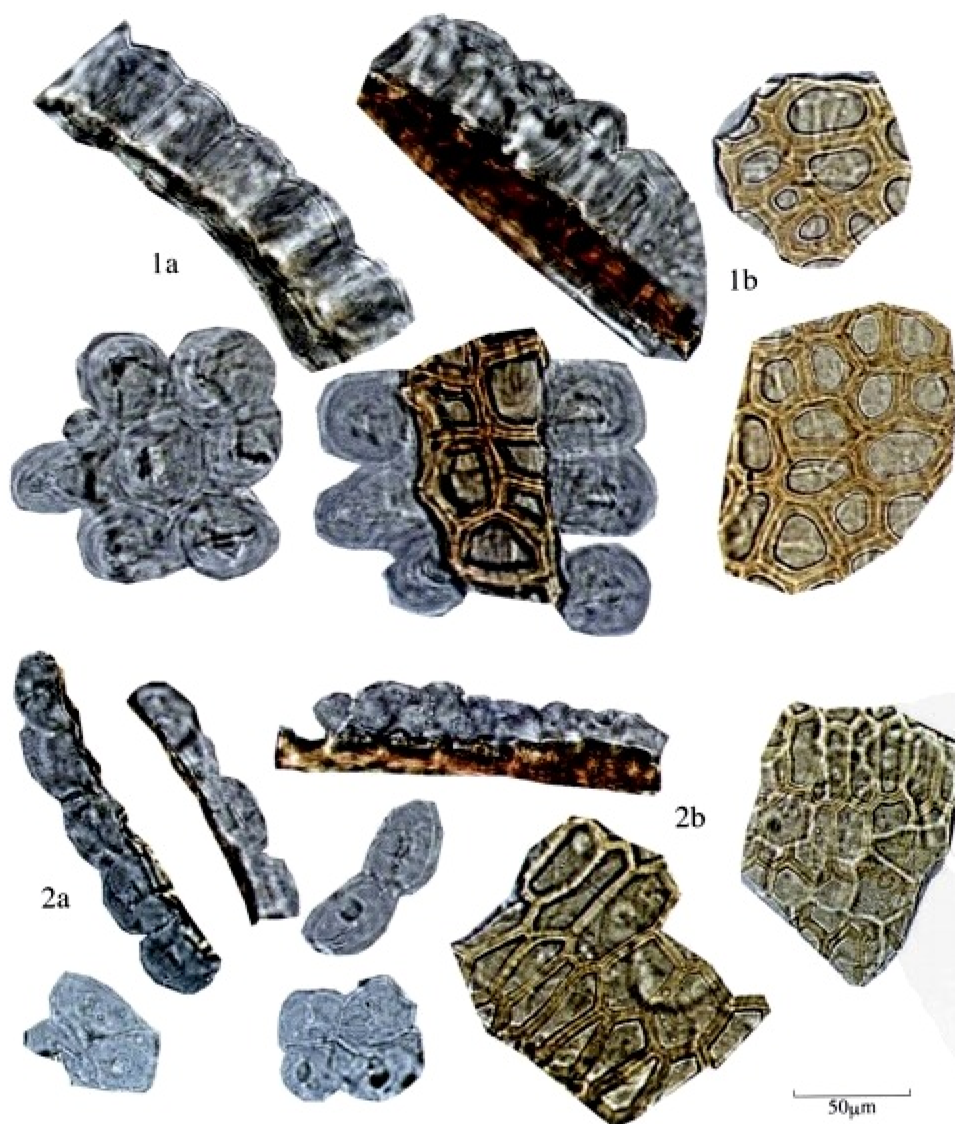


图1 葶苈子[（*Lepidium apetalum*）和（*Descurainia sophia*）种子] 粉末

[Fig1 Powder of seed from *Lepidium apetalum* and *Descurainia sophia*]

1. 北葶苈子（*Lepidium apetalum*） 2. 南葶苈子（*Descurainia sophia*）

a. 种皮表皮细胞（Epidermal cells of testa） b. 种皮内表皮细胞（Inner epidermal cells of testa）

萹　蓄
Bianxu
HERBA POLYGONI AVICULARIS

本品为蓼科植物萹蓄*Polygonum aviculare* L. 的干燥地上部分。

[显微特征]　**本品粉末**：灰绿色。叶上、下表皮细胞垂周壁近平直，平周壁有角质线纹，气孔主为不等式，副卫细胞3个。叶上下表面均有栅栏组织，薄壁细胞含草酸钙簇晶，直径18～43μm。（图1）

Powder: Greyish-green. The epidermal cells on both surfaces of leaf with almost straight anticlinal and striated periclinal walls. Stomata mostly anisocytic, with 3 subsidiary cells. Palisade tissues occuring inside the upper and lower epidermis, parenchymatous cells containing clusters of calcium oxalate, 18～43 μm in diameter.（Fig 1）



图1　萹蓄（*Polygonum aviculare* 地上部分）粉末

[Fig1　Powder of aerial part from *Polygonum aviculare*]

1. 下表皮细胞及气孔（Lower epidermal cells and stomata）　2. 上表皮细胞（Upper epidermal cells）　3. 叶片断面观（Sectional view of leaf）　4. 茎表皮细胞（Epidermal cells of stem）　5. 草酸钙簇晶（Clusters of calcium oxalate）

楮 实 子

Chushizi

FRUCTUS BROUSSONETIAE

本品为桑科植物构树 *Broussonetia papyrifera*（L.）Vent. 的干燥成熟果实。

[显微特征] **本品粉末**：红棕色。果皮栅状细胞壁黏液化，残存具细齿状的条纹增厚部分，形似细芒。含晶厚壁细胞成片，棕黄色，表面观类多角形，内含草酸钙簇晶；断面观类长方形，内壁极厚，胞腔偏靠外侧，簇晶矩圆形。内果皮厚壁细胞甚扁平，常多层重叠，界限不清。种皮表皮细胞表面观多角形，壁略呈连珠状增厚，非木化，胞腔内含黄棕色物。（图1）

Powder: Reddish-brown. Palisade cell walls of pericarp mucilaginous, remaining denticulate striate-thickened part, fine awn-like in shape. Crystalliferous sclerenchymatous cells abundant, brownish-yellow, subpolygonal in surface view, containing clusters of calcium oxalate, subrectangular in section view, inner walls extremely thickened, lumina situated near outside, clusters oblong. Sclerenchymatous cells of endocarp flattened, frequently overlapped in many layers with indistinct boundary. Epidermal cells of testa polygonal in surface view, with slightly beaded, unlignified walls, lumina containing yellowish-brown contents.（Fig 1）

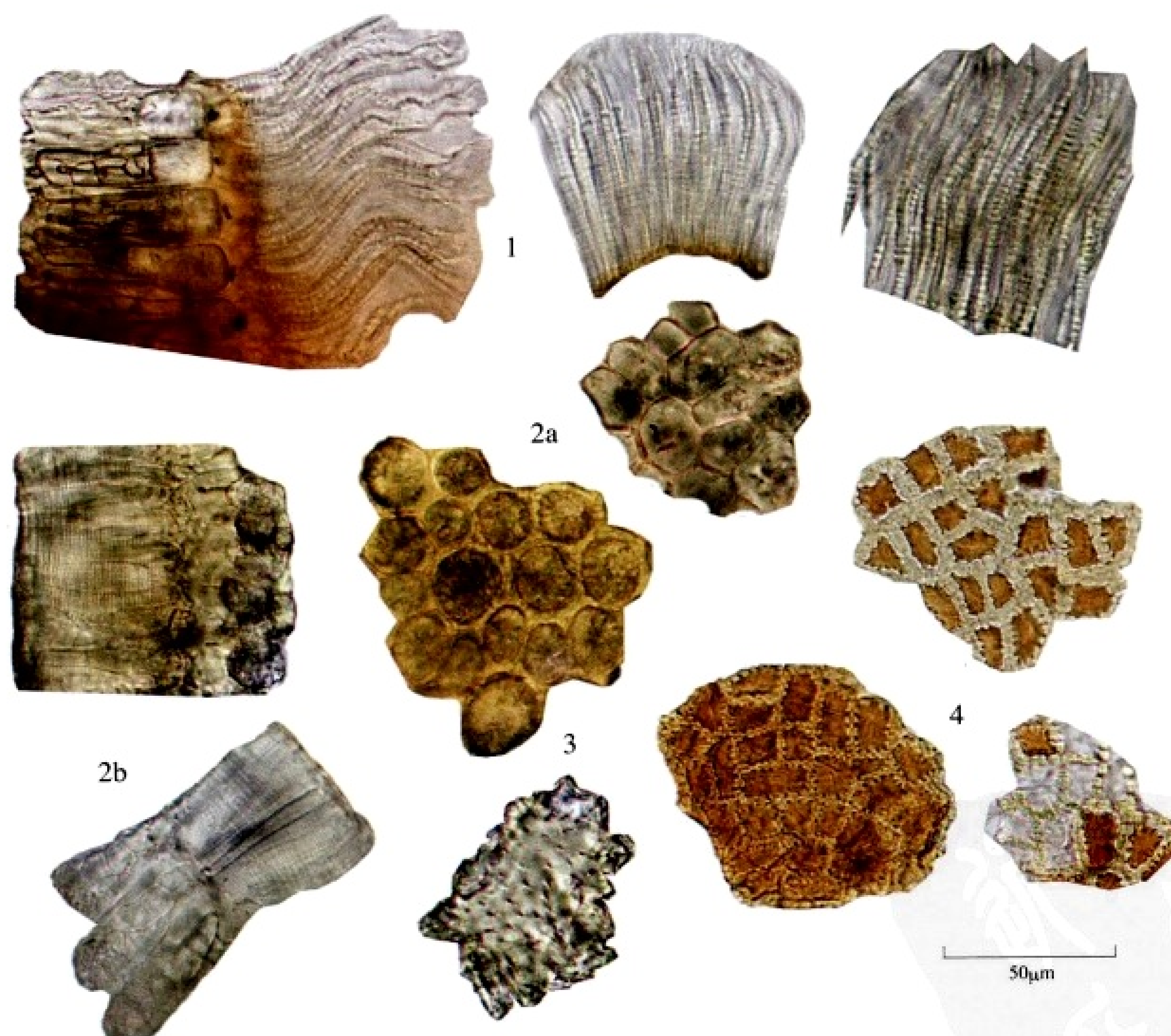


图1 楮实子（*Broussonetia papyrifera* 果实）粉末

[Fig1 Powder of fruit from *Broussonetia papyrifera*]

1. 果皮栅状细胞（Palisade cells of pericarp） 2. 含晶厚壁细胞 [Crystalliferous sclerenchymatous cells（a. 表面观Surface view b. 断面观Section view）] 3. 内果皮厚壁细胞（Sclerenchymatous cells of endocarp） 4. 种皮表皮细胞（Epidermal cells of testa）

紫花地丁

Zihuadiding

HERBA VIOLAE

本品为堇菜科植物紫花地丁*Viola yedoensis* Makino的干燥全草。

[显微特征]　**本品叶的横切面：**上表皮细胞较大，切向延长，外壁较厚，内壁黏液化，常膨胀呈半圆形；下表皮细胞较小，偶有黏液细胞；上、下表皮有单细胞非腺毛，长32～240μm，直径24～32μm，具角质短线纹。栅栏细胞2～3列；海绵细胞类圆形，含草酸钙簇晶，直径11～40μm。主脉维管束外韧型，上、下表皮内方有厚角细胞1～2列。（图1、2）

Transverse section of leaf: Upper epidermal cells relatively large, tangentially elongated, the outer walls thickened and the inner walls mucilaginous, frequently swollen into semi-circle; the lower epidermal cells relatively small, occasionally occurring mucilage cells; both upper and lower epidermis bearing unicellular non-glandular hairs, 32 ~ 240 μm long, 24 ~ 32 μm in diameter, with short cuticle striations. Palisade cells 2 ~ 3 layers; spongy cells subrounded, containing clusters of calcium oxalate, 11 ~ 40 μm in diameter. Midrib vascular bundles collateral, the inner side of both upper and lower epidermis occurring 1 ~ 2 layers of collenchymatous cells. (Fig 1, 2)

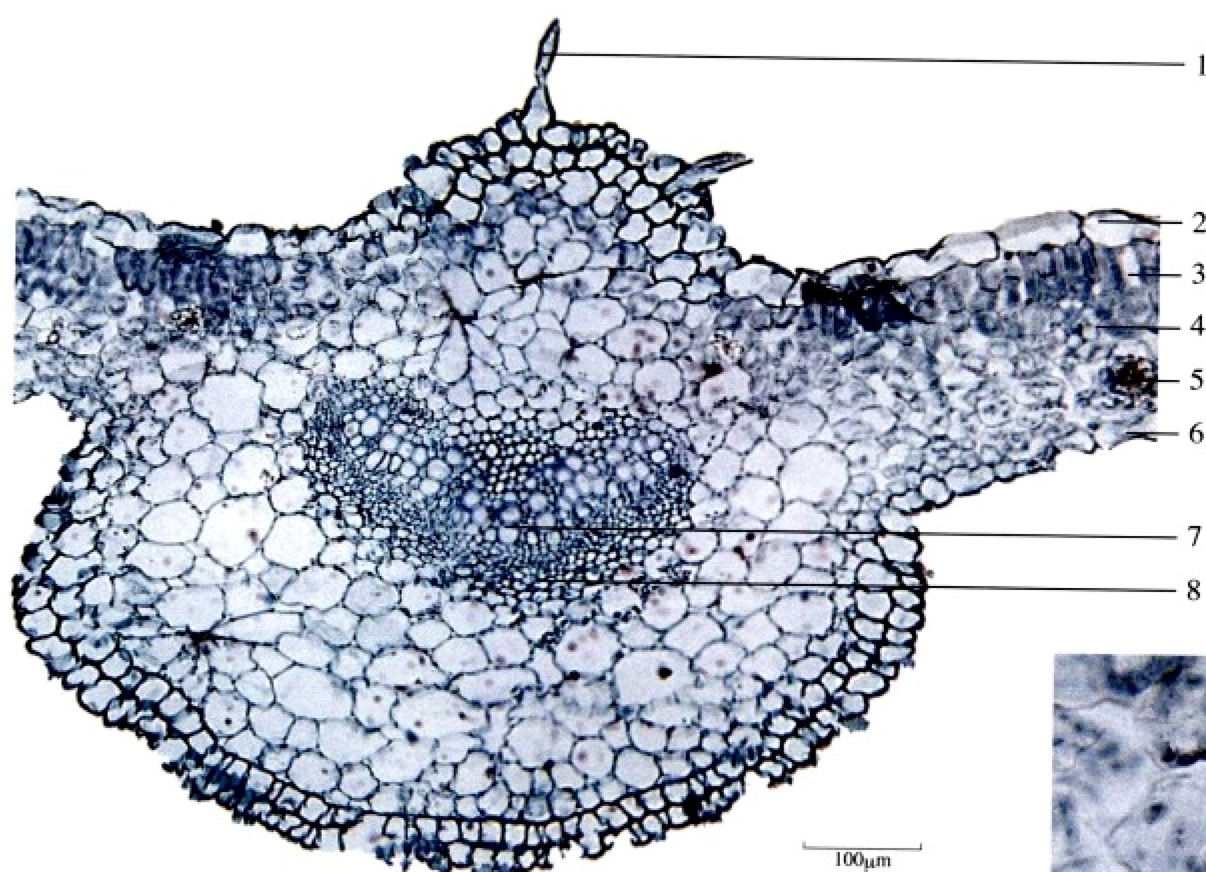


图1　紫花地丁（*Viola yedoensis*叶）横切面

[Fig1　Transverse section of leaf from *Viola yedoensis*]

1. 非腺毛（Non-glandular hairs）　2. 上表皮细胞（Upper epidermis cells）　3. 栅栏细胞（Palisade cells）　4. 海绵细胞（Spongy cells）　5. 草酸钙簇晶（Clusters of calcium oxalate）　6. 下表皮细胞（Lower epidermis cells）　7. 主脉维管束（Midrib vascular bundles）　8. 厚角细胞（Collenchymatous cells）

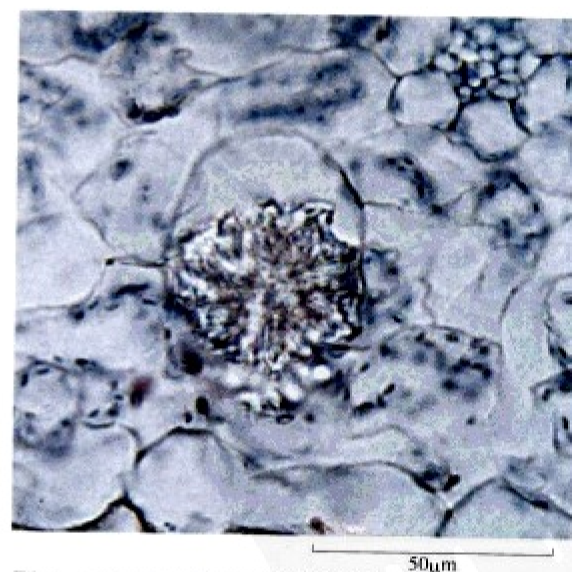


图2　示海绵细胞含草酸钙簇晶

[Fig2　Showing spongy cells containing clusters of calcium oxalate]

紫　菀

Ziwan

RADIX ET RHIZOMA ASTERIS

本品为菊科植物紫菀*Aster tataricus* L. f. 的干燥根及根茎。

[显微特征]　本品根横切面：表皮细胞多萎缩或有时脱落，内含紫红色色素。下皮细胞1列，略切向延长，侧壁及内壁稍厚，有的含紫红色色素。皮层宽广，有细胞间隙；分泌道4～6个，位于皮层内侧；内皮层明显。中柱小，木质部略呈多角形；韧皮部束位于木质部弧角间；中央通常有髓。（图1）

Transverse section of root: Epidermal cells frequently withered or sometimes falling off, containing purplish-red pigments. Hypodermal cells in 1 layer, somewhat elongated tangentially, some containing purplish-red pigments, lateral and inner walls slightly thickened. Cortex broad, with intercellular spaces; secretory ducts 4～6, in the inside of cortex; endodermis distinct. Stele small; xylem somewhat polygonal; phloem bundles located between the arcs of primary xylems; the centre usually showing a pith. (Fig 1)

根茎表皮有腺毛，皮层散有石细胞及厚壁细胞。根及根茎薄壁细胞含菊糖，有的含草酸钙簇晶。

Epidermis of rhizomes with glandular hairs; cortex scattered with stone cells and sclerenchymatous cells. Parenchymatous cells of root and rhizome containing inulin, sometimes containing clusters of calcium oxalate.

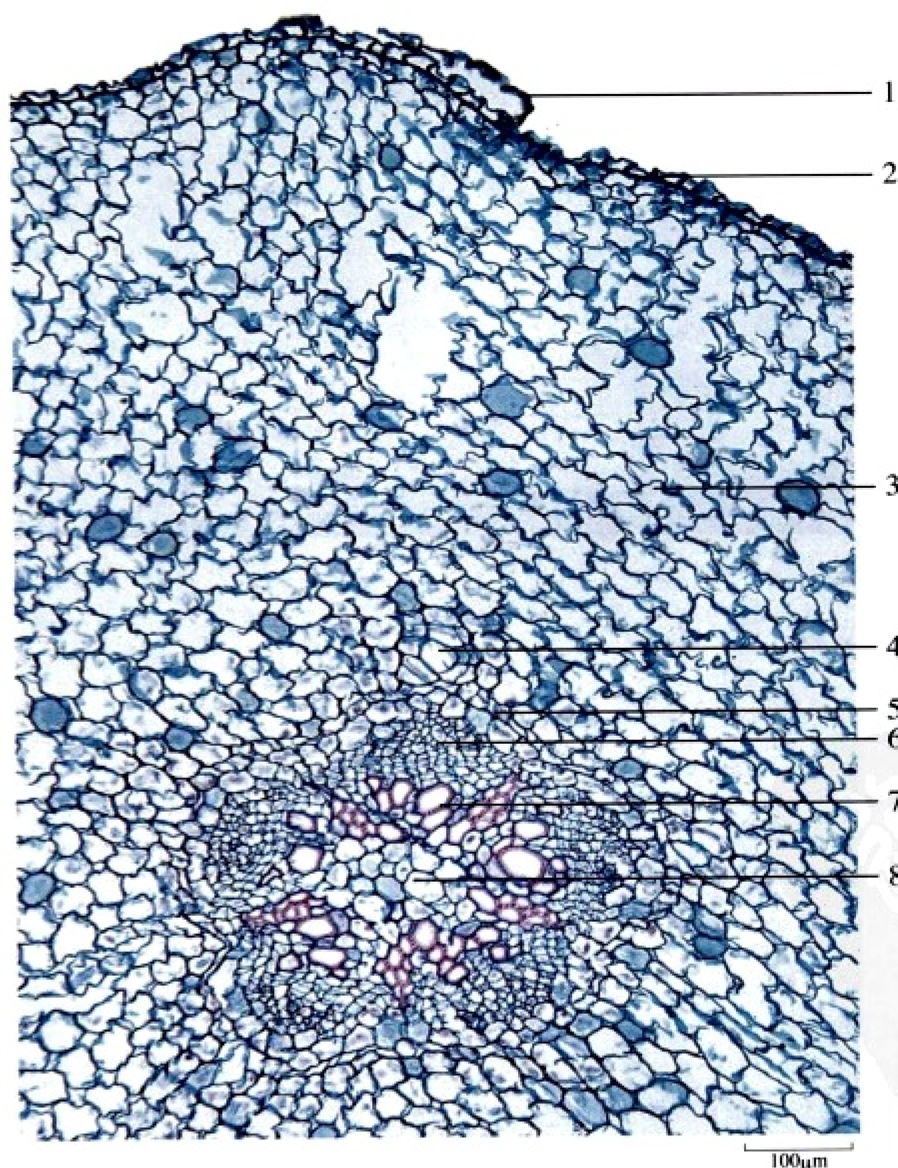


图1　紫菀（*Aster tataricus* 根）横切面

[Fig1　Transverse section of root from *Aster tataricus*]

1. 表皮细胞残余（Remnant epidermal cells）　2. 下皮细胞（Hypodermal cells）
3. 皮层（Cortex）　4. 分泌道（Secretory ducts）　5. 内皮层（Endodermis）
6. 韧皮部（Phloem）　7. 木质部（Xylem）　8. 髓（Pith）

黑种草子

Heizhongcaozi

SEMEN NIGELLAE

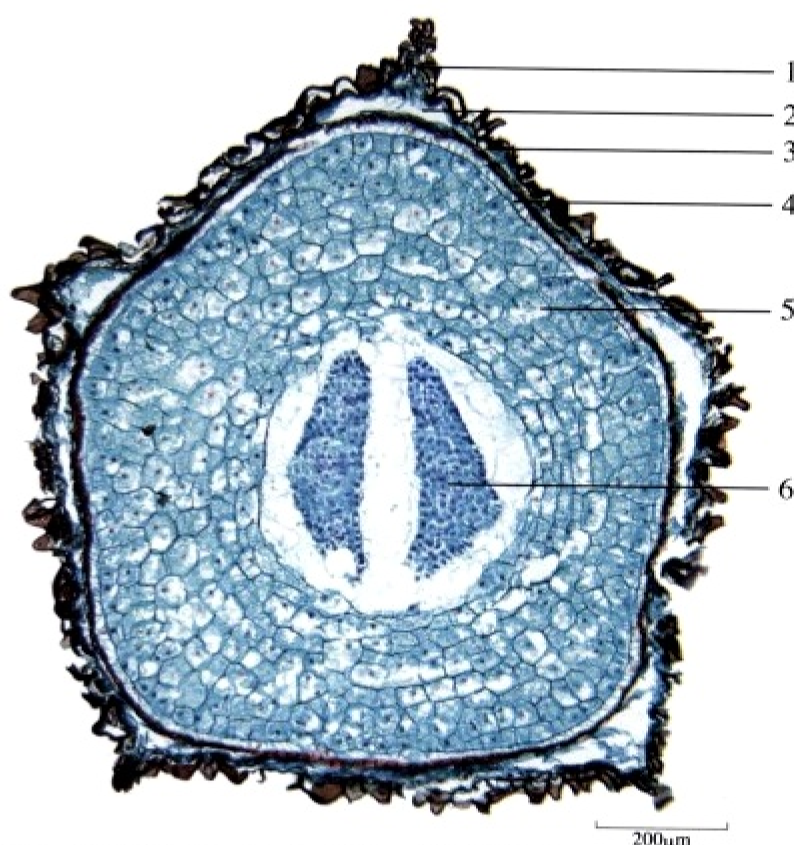


图1　黑种草子(*Nigella glandulifera* 种子)横切面

[Fig1　Transverse section of seed from *Nigella glandulifera*]

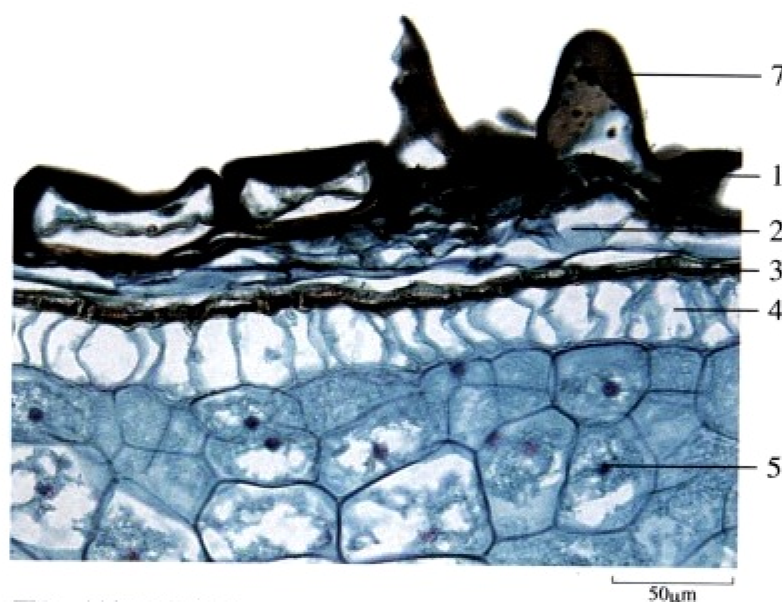


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 表皮细胞（Epidermal cells）　2. 种皮薄壁细胞（Parenchymatous cells of testa）　3. 内表皮细胞（Inner epidermal cells）　4. 外胚乳细胞（Perisperm cells）　5. 内胚乳细胞（Endosperm cells）　6. 子叶细胞（Cotyledon cells）　7. 种皮表皮细胞乳突（Papilla formed by epidermal cells）

本品为毛茛科植物瘤果黑种草*Nigella glandulifera* Freyn 的干燥成熟种子。

[显微特征]　本品横切面：种皮表皮细胞1列，大小不一，类长方形或不规则长圆形，多切向延长，外壁大多向外突起呈乳突状或延伸似非腺毛状，壁稍厚，暗棕色，角质层较薄，隐约可见细密颗粒状纹理；种皮薄壁细胞3～4列，长方形或不规则形，略切向延长；内表皮细胞1列，扁平形，棕色。外胚乳为1列长方形细胞，径向延长，有时呈颓废状；内胚乳细胞多角形，充满油滴和糊粉粒。子叶细胞多角形或类圆形，最外一层略径向延长，充满糊粉粒及脂肪油滴。（图1、2）

Transverse section: Epidermal cells of testa 1 layer, varying in size, subrectangular or irregular oblong, frequently elongated tangentially, outer walls often protruding outside forming papillae or non-glandular hairs, walls slightly thickened, dark brown; cuticle layer thin, finely and densely granulate striations indistinctly visible. Parenchyma of testa consisting of 3 ~ 4 layers of cells, rectangular or irregular, somewhat elongated tangentially; inner epidermal cells 1 layer, flattened, brown. Perisperm consisting of 1 layer of rectangular cells, elongated radially, sometimes dilapidated; endosperm cells polygonal, filled with oil droplets and aleurone grains. Cotyledon cells polygonal or subrounded, cells of the outmost layer slightly elongated radially, filled with aleurone grains and fatty oil droplets. (Fig 1, 2)

本品粉末：灰黑色。种皮表皮细胞暗棕色，表面观类多角形，大小不一，外壁拱起或呈乳突状。种皮内表皮细胞棕色，表面观长方形、类方形或类多角形，垂周壁连珠状增厚，平周壁有细密网状纹理。胚乳细胞多角形，内含油滴和糊粉粒。（图3）

Powder: Greyish-black. Epidermal cells of testa dark brown, polygonal in surface view, varying in size, the outer walls gibbose or mammillate. The inner epidermis of testa brown, rectangular, subsquare or subpolygonal in surface view, anticlinal walls beaded thickened, periclinal walls finely and densely reticulate-striated. Endosperm cells polygonal, containing oil droplets and aleurone grains. （Fig 3）

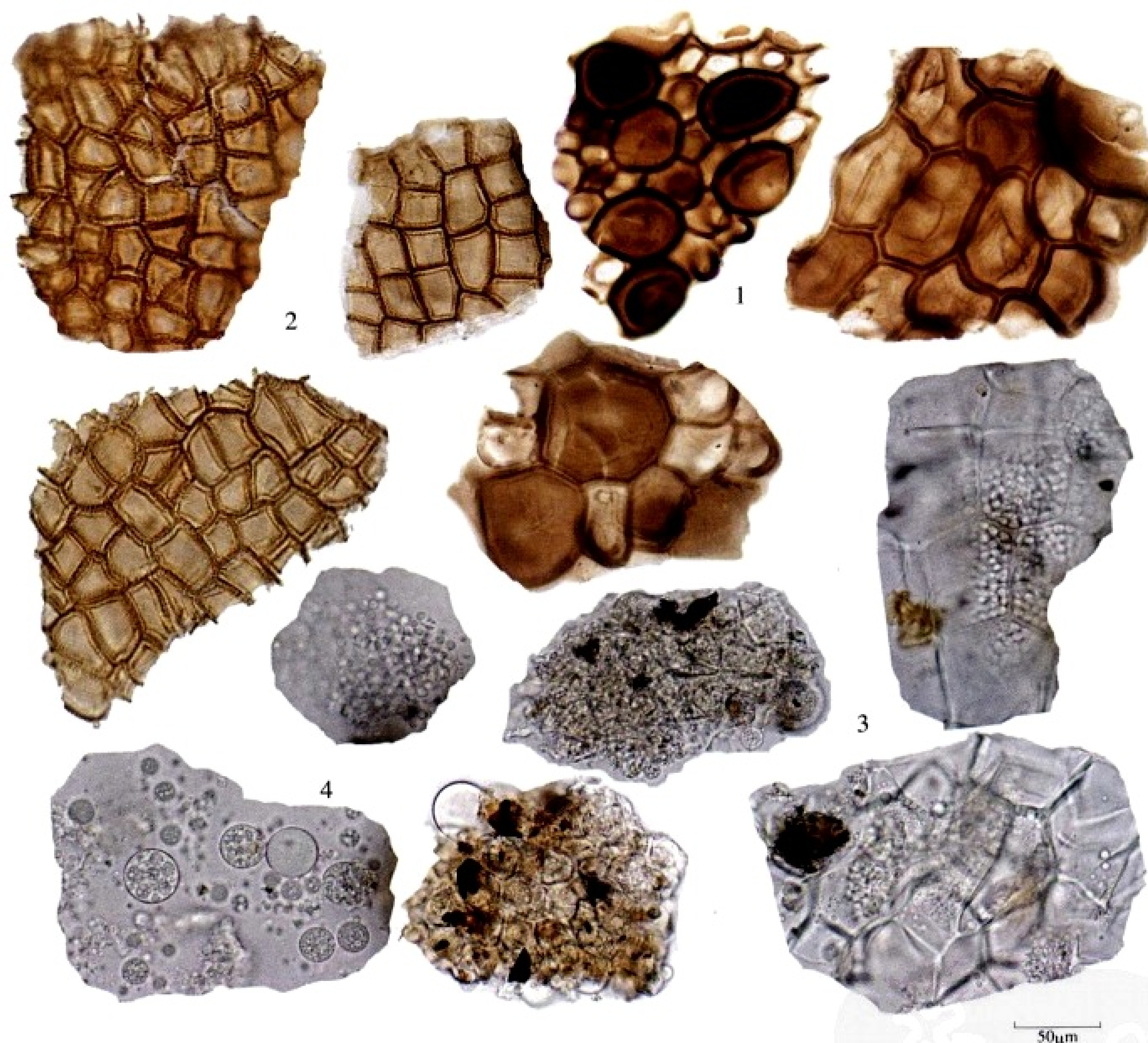


图3 黑种草子（*Nigella glandulifera* 种子）粉末

[Fig3 Powder of seed from *Nigella glandulifera*]

1. 种皮表皮细胞（Epidermal cells of seed coat） 2. 种皮内表皮细胞（Inner epidermal cells of seed coat） 3. 胚乳细胞（Endosperm cells）
4. 油滴和糊粉粒（Oil droplets and aleurone grains）

鹅不食草

Ebushicao

HERBA CENTIPEDAE

本品为菊科植物鹅不食草*Centipeda minima*（L.）A. Br. et Aschers. 的干燥全草。

［显微特征］ 本品粉末：灰绿色至灰棕色。茎表皮细胞呈长方形或类多角形，壁稍厚，表面隐约可见角质纹理；具气孔。叶表皮细胞表面观呈类多角形，垂周壁薄，波状弯曲；气孔不定式，副卫细胞4～6个。腺毛顶面观呈鞋底形，细胞成对排列，内含黄色物。花冠表皮细胞黄色，表面观呈长方形或类多角形，细胞向外延伸呈绒毛状突起，表面有角质纹理；非腺毛2列性；1列为单细胞，稍短，另列为2细胞，基部细胞较短，先端常呈钩状或卷曲，上部2/3表面有微细角质纹理。花粉粒淡黄色，呈类圆形，直径15～22μm，具3孔沟，表面有刺。（图 1）

Powder: Greyish-green to greyish-brown. Epidermal cells of stem rectangular or subpolygonal, walls slightly thickened, with indistinct cuticular striations on surface; stomata visible. Epidermal cells of leaf subpolygonal in surface view, anticlinal walls thin and sinuous; stomata anomocytic, subsidiary cells 4 ~ 6. Glandular hairs paramecium-like in top surface view, cells arranged in pairs, containing yellow contents. Epidermal cells of corolla yellow, rectangular or subpolygonal in surface view and with cuticular striations on surface, cells projected out to be tomentellate; non-glandular hairs biseriate, one unicellular, slightly short, the other bicellular, the base cell relatively short, hooked or rolled at apex and with fine cutiular striations on the surface of 2/3 of the upper part. Pollen grains pale yellow, subrounded, 15 ~ 22 um in diameter, with 3 germinal furrows, exine spiny. (Fig 1)

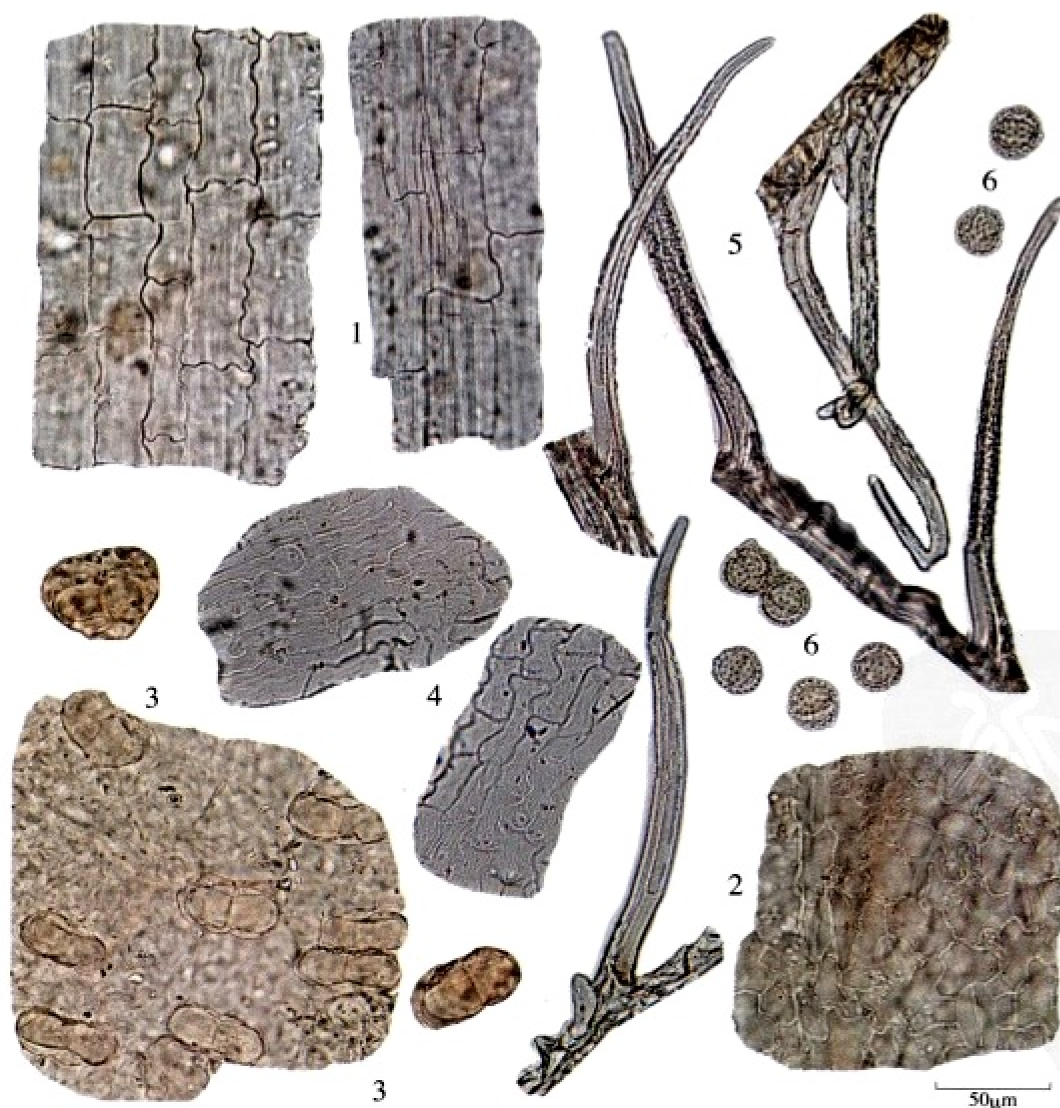


图1 鹅不食草（*Centipeda minima* 全草）粉末

[Fig1 Powder of herb from *Centipeda minima*]

1. 茎表皮细胞（Epidermal cells of stem） 2. 叶表皮细胞及气孔（Epidermal cells and stomata of leaf） 3. 腺毛（Glandular hairs） 4. 花冠表皮细胞（Epidermal cells of corolla） 5. 非腺毛（Non-glandular hairs） 6. 花粉粒（Pollen grains）

番　泻　叶

Fanxieye

FOLIUM SENNAE

本品为豆科植物狭叶番泻*Cassia angustifolia* Vahl 或尖叶番泻*Cassia acutifolia* Delile 的干燥小叶。

[显微特征]　**本品粉末**：淡绿色或黄绿色。晶纤维多，草酸钙方晶直径12～15μm。非腺毛单细胞，长56～350μm，直径12～25μm，壁厚，有疣状突起。草酸钙簇晶存在于叶肉薄壁细胞中，直径9～20μm。上下表皮细胞表面观呈多角形，垂周壁平直；上下表皮均有气孔，主为平轴式，副卫细胞大多为2个，也有3个的。（图1）

Powder: Pale green or yellowish-green. Crystal fibres numerous, prisms of calcium oxalate 12 ~ 15 μm in diameter. Non-glandular hairs unicellular, 56 ~ 350 μm long, 12 ~ 25 μm in diameter, with thickened and warty walls. Clusters of calcium oxalate occurring in parenchymatous cells of mesophyll, 9 ~ 20 μm in diameter. Epidermal cells of both surfaces polygonal in surface view, with straight anticlinal walls; stomata occurring on both surfaces, mostly paracytic, subsidiary cells mostly 2, sometimes 3.（Fig 1）



图1　番泻叶（*Cassia angustifolia* 小叶）粉末

[Fig1　Powder of leaflet from *Cassia angustifolia*]

1. 晶纤维（Crystal fibres）　2. 非腺毛（Non-glandular hairs）　3. 草酸钙簇晶（Clusters of calcium oxalate）
4. 表皮细胞（Epidermal cells）　5. 气孔（Stomata）

湖北贝母

Hubeibeimu

BULBUS FRITILLARIAE HUPEHENSIS

本品为百合科植物湖北贝母*Fritillaria hupehensis* Hsiao et K. C. Hsia 的干燥鳞茎。

[显微特征] 本品粉末：淡棕黄色。淀粉粒甚多，广卵形、长椭圆形或类圆形，直径7～54μm，脐点点状、人字状、裂缝状，层纹明显，细密；偶见复粒，由2～3分粒组成，形小。表皮细胞方形或多角形，垂周壁呈不整齐的连珠状增厚；有时可见气孔，扁圆形，直径54～62μm，副卫细胞4～5个。草酸钙结晶棱形、方形、颗粒状或簇状，直径可达50μm。导管螺纹或环纹，直径6～20μm。(图1)

Powder: Pale brownish-yellow. Starch granules fairly abundant, broadly ovoid, long ellipsoid or subspheroid, 7 ~ 54 μm in diameter, hilum pointed, V-shaped, slit-shaped, striations distinct, fine and dense; compound granules of 2 ~ 3 components, smaller, visible occasionally. Epidermis cells subsquare or polygonal, anticlinal walls irregularly beaded; sometimes stomata visible, oblate, 54～62 μm in diameter, with 4～5 subsidiary cells. Crystals of calcium oxalate rhombic, subsquare, granular or clustered, up to 50 μm in diameter. Spiral or annular vessels 6～20 μm in diameter. (Fig 1)



图1 湖北贝母（*Fritillaria hupehensis* 鳞茎）粉末

[Fig1 Powder of bulb from *Fritillaria hupehensis*]

1. 淀粉粒（Starch granules） 2. 表皮细胞（Epidermal cells） 3. 草酸钙结晶（Crystals of calcium oxalate） 4. 导管（Vessels）

蒺　　藜

Jili

FRUCTUS TRIBULI

本品为蒺藜科植物蒺藜*Tribulus terrestris* L. 的干燥成熟果实。

[显微特征]　本品粉末：黄绿色。内果皮纤维木化，上下层纵横交错排列，少数单个散在，有时纤维束与石细胞群相连结。中果皮纤维多成束，多碎断，直径15～40μm，壁甚厚，胞腔疏具圆形点状纹孔。石细胞长椭圆形或类圆形，成群。种皮细胞多角形或类方形，直径约30μm，壁网状增厚，木化。草酸钙方晶直径8～20μm。(图1)

Powder: Yellow-green. Fibres of endocarp lignified, arranged upper and lower layers in crisscross, a few scattered singly, sometimes fibre bundles connected with stone cells. Fibres of mesocarp mostly in bundles, often broken, 15～40μm in diameter, walls heavily thickened, with point pits sparsely in lumina. Stone cells elongated elliptical or subrounded, occuring in groups. Testa cells polygonal or subsquare, about 30 μm in diameter, walls reticulately thickened, lignified. Prisms of calcium oxalate 8～20 μm in diameter. (Fig 1)

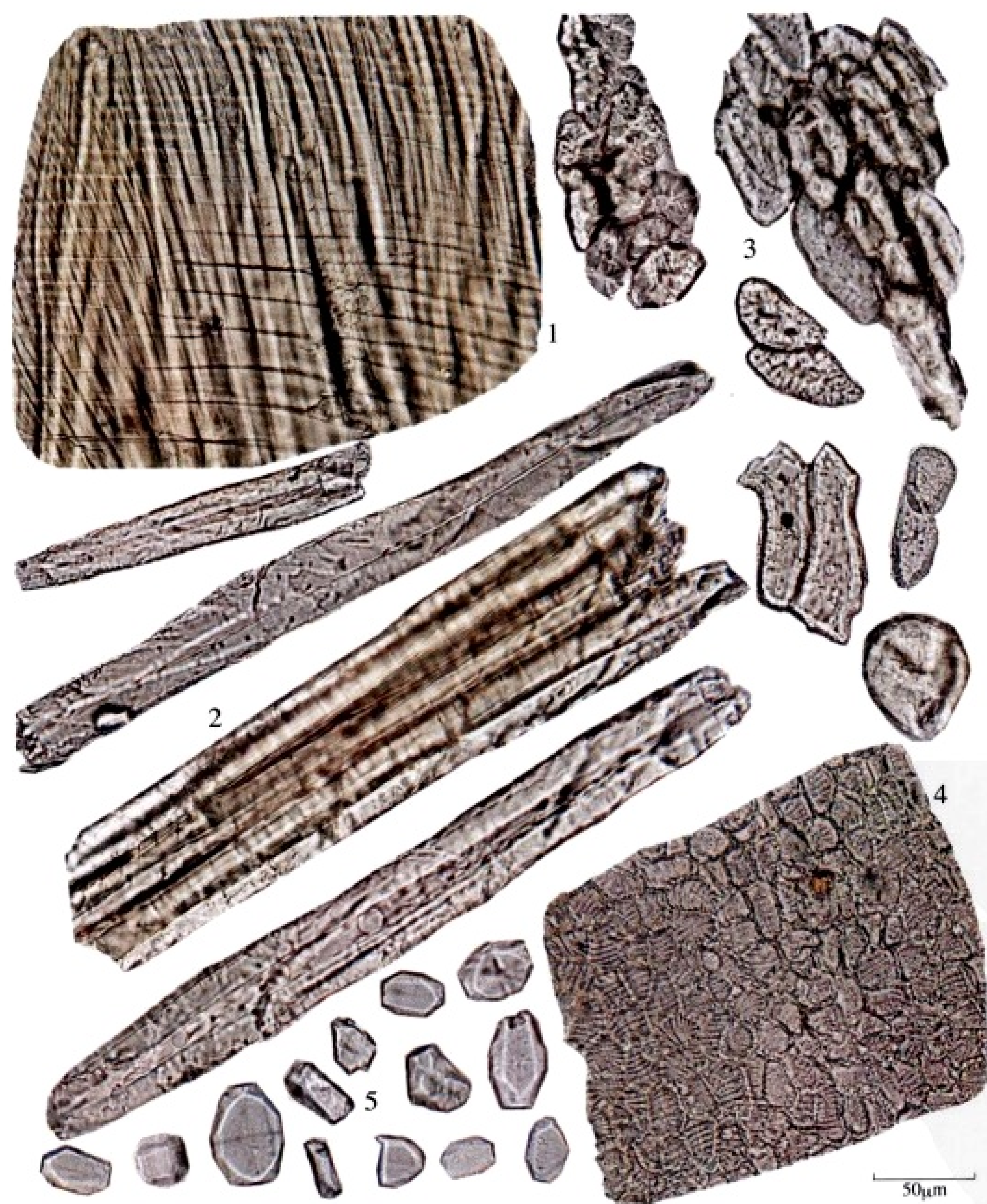


图1　蒺藜（*Tribulus terrestris* 果实）粉末

[Fig1　Powder of fruit from *Tribulus terrestris*]

1. 内果皮纤维（Endocarp fibres）　2. 中果皮纤维（Mesocarp fibres）　3. 石细胞（Stone cells）　4. 种皮细胞（Testa cells）　5. 草酸钙方晶（Prisms of calcium oxalate）

蒲　公　英
Pugongying
HERBA TARAXACI

本品为菊科植物蒲公英*Taraxacum mongolicum* Hand.-Mazz.、碱地蒲公英*Taraxacum sinicum* Kitag.或同属数种植物的干燥全草。

[显微特征]　**（1）本品叶表面观：**上下表皮细胞垂周壁波状弯曲，表面角质纹理明显或稀疏可见。上下表皮均有非腺毛，3～9细胞，直径17～34μm，顶端细胞甚长，皱缩呈鞭状或脱落。下表皮气孔较多，不定式或不等式，副卫细胞3～6个。叶肉细胞含细小草酸钙结晶。叶脉旁可见乳汁管。（图1）

Surface view of leaf: Epidermal cells on both surfaces with sinuous anticlinal walls, cuticular striations distinct or sparsely visible. Both surfaces bearing non-glandular hairs, 3～9 celled, 17～34 μm in diameter, apical cells extremely long, crumpled to whip-shape or fallen off. Stomata more frequently occurring on the lower surface, anomocytic or anisocytic, with 3～6 subsidiary cells. Mesophyll cells containing fine crystals of calcium oxalate. Laticiferous tubes occurring alongside veins. (Fig 1)



图1　蒲公英（*Taraxacum mongolicum* 叶）表面观

[Fig1　Surface view of leaf from *Taraxacum mongolicum*]

1. 上表皮细胞（Upper epidermal cells）　2. 下表皮细胞（Lower epidermal cells）　3. 非腺毛（Non-glandular hairs）　4. 叶肉细胞（Mesophyll cells）　5. 乳汁管（Laticiferous tubes）

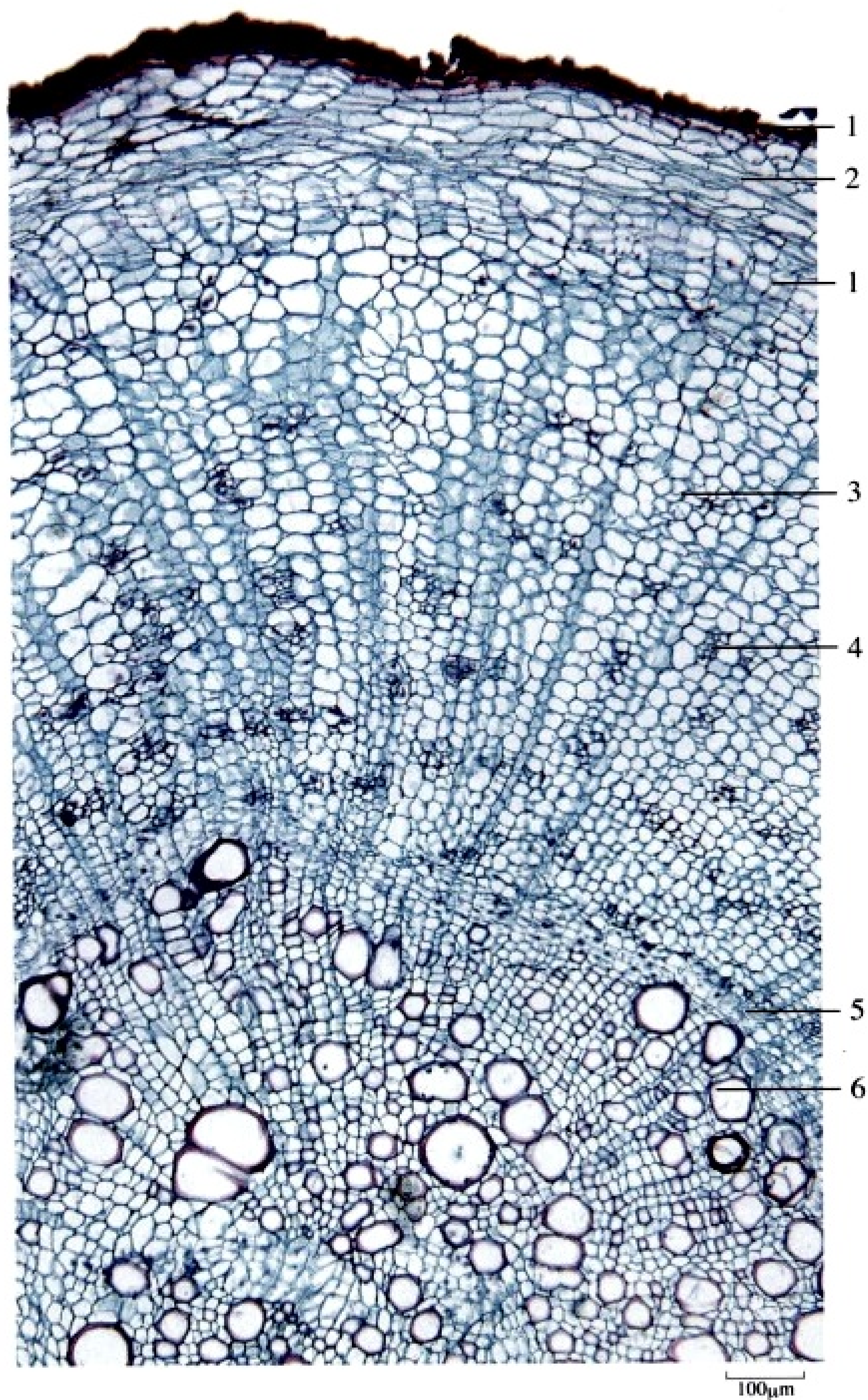


图2 蒲公英（*Taraxacum mongolicum* 根）横切面
[Fig2 Transverse section of root from *Taraxacum mongolicum*]
1. 木栓层（Cork） 2. 栓内层（Phelloderm） 3. 韧皮部（Phloem） 4. 乳管群（Groups of laticiferous tubes） 5. 形成层（Cambium） 6. 木质部（Xylem）

（2）本品根横切面：木栓细胞数列，棕色。韧皮部宽广，乳管群断续排列成数轮。形成层成环。木质部较小，射线不明显；导管较大，散列。薄壁细胞含菊糖。（图2、3）

Transverse section of root: Cork consisting of several layers of brown cells. Phloem broad, groups of laticiferous tubes arranged in several interrupted rings. Cambium in a ring. Xylem relatively small, with indistinct rays; vessels relatively large, scattered. Parenchymatous cells containing inulin. (Fig 2, 3)

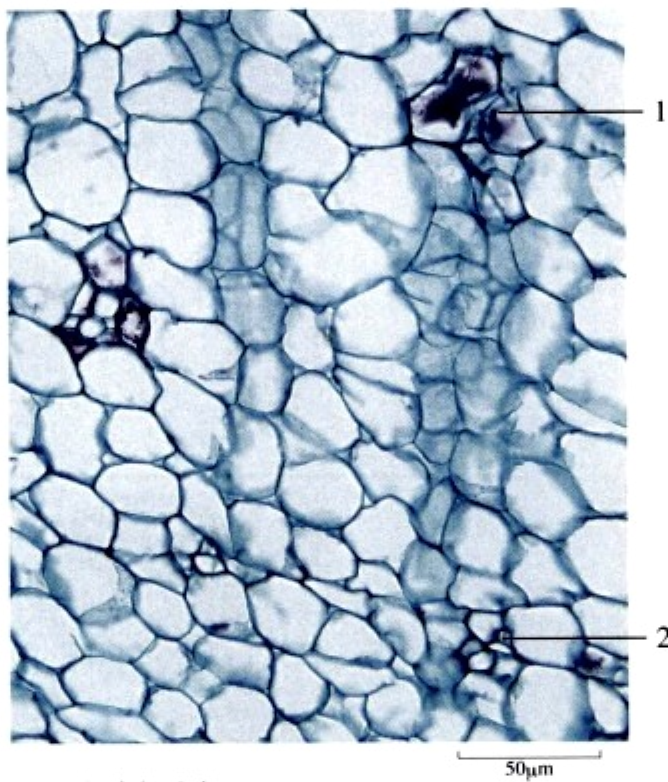


图3 韧皮部放大
[Fig3 Phloem magnified]
1. 乳管群（Groups of laticiferous tubes） 2. 筛管群（Sieve tube groups）

蒲　　黄
Puhuang
POLLEN TYPHAE

本品为香蒲科植物水烛香蒲*Typha angustifolia* L.、东方香蒲*Typha orientalis* Presl或同属植物的干燥花粉。

[显微特征]　本品粉末：黄色。花粉粒类圆形或椭圆形，直径17～29μm，表面有网状雕纹，周边轮廓线光滑，呈凸波状或齿轮状，具单孔，不甚明显。(图1)

Powder: Yellow. Pollen grains subrounded or elliptical, 17 ~ 29 μm in diameter, exine with reticulate sculptures, with convex wavy or gear-shaped contour line, single pores indistinct. (Fig 1)

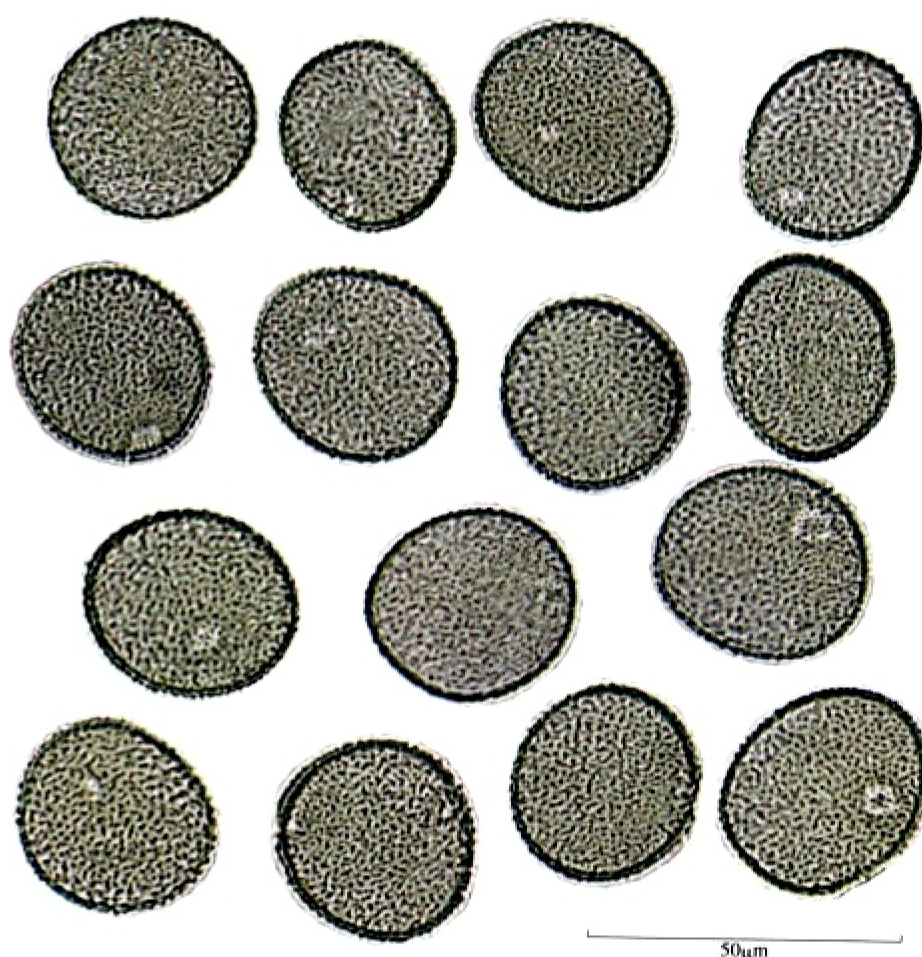


图1　蒲黄（*Typha angustifolia* 花粉）粉末
[Fig1　Powder of pollen from *Tyoha angustiflolia*]

椿 皮

Chunpi

CORTEX AILANTHI

本品为苦木科植物臭椿*Ailanthus altissima* （Mill.） Swingle 的干燥根皮或干皮。

[显微特征]　本品根皮粉末：淡灰黄色。石细胞甚多，类圆形、类方形或形状不规则，直径24～96μm，壁厚，或三面较厚，一面较薄，有的胞腔内含草酸钙方晶。纤维直径20～40μm，壁极厚，木化。草酸钙方晶直径11～48μm；簇晶直径约至48μm。淀粉粒类球形或卵圆形，直径3～13μm。（图1）

干皮粉末：灰黄色。木栓细胞碎片较多，草酸钙簇晶偶见，无淀粉粒。

Powder of root bark: Pale greyish-yellow. Stone cells numerous, subrounded, subsquare or irregular, 24～96 μm in diameter, with thickened walls or three sides of walls thicker than the another side, some containing prisms of calcium oxalate in lumina. Fibres 20～40 μm in diameter, walls extremely thickened and lignified. Prisms of calcium oxalate 11～48 μm in diameter; clusters up to 48 μm in diameter. Starch granules subspherical or ovoid, 3～13 μm in diameter. （Fig 1）

Powder of stem bark: Greyish-yellow. Fragments of cork cells numerous, clusters of calcium oxalate occasionally visible, starch granules absent.



图1　椿皮（*Ailanthus altissima* 根皮）粉末

[Fig1　Powder of root bark from *Ailanthus altissima*]

1. 石细胞（Stone cells）　2. 纤维（Fibres）　3. 草酸钙方晶（Prisms of calcium oxalate）　4. 草酸钙簇晶（Clusters of calcium oxalate）　5. 淀粉粒（Starch granules）　6. 木栓细胞（Cork cells）

槐　　花

Huaihua

FLOS SOPHORAE

本品为豆科植物槐 *Sophora japonica* L. 的干燥花及花蕾。

[显微特征]　**本品粉末**：黄绿色。花粉粒类球形或钝三角形，直径14～19μm，具3 个萌发孔。萼片表皮细胞表面观呈多角形；非腺毛1～3细胞，长86～660μm。气孔不定式，副卫细胞4～8个。草酸钙方晶较多。(图1)

Powder: Yellowish-green. Pollen grains subspherical or obtusely triangular, 14 ~ 19 μm in diameter, with 3 germinating pores. Epidermal cells of sepals polygonal in surface view; non-glandular hairs each consisting of 1 ~ 3 cells, 86 ~ 660 μm long. Stomata anomocytic, each with 4 ~ 8 subsidiary cells. Prisms of calcium oxalate frequently visible. (Fig 1)



图1　槐花（*Sophora japonica* 花及花蕾）粉末

[Fig1　Powder of flower and flower bud from *Sophora japonica*]

1. 花粉粒（Pollen grains）　2. 非腺毛（Non-glandular hairs）　3. 萼片表皮细胞及气孔（Calyx epidermal cells and stomata）

4. 草酸钙方晶（Prisms of calcium oxalate）

雷 丸

Leiwan

OMPHALIA

本品为白蘑科真菌雷丸*Omphalia lapidescens* Schroet. 的干燥菌核。

[显微特征] 本品粉末：淡灰色。菌丝黏结成大小不一的不规则团块，无色，少数黄棕色或棕红色。散在的菌丝较短，有分枝，直径约4μm。草酸钙方晶细小，直径约至8μm，有的聚集成群。加硫酸后可见多量针状结晶。（图1）

Powder: Pale grey. Hyphae sticked together forming irregular masses, varying in size, colourless, a few in yellowish-brown or brownish-red colourness. Scattered hyphae short, with branches, about 4 μm in diameter. Prisms of calcium oxalate fine, up to about 8 μm in diameter, some gathered in groups. Abundant needle crystals observed after adding sulfuric acid. （Fig 1）

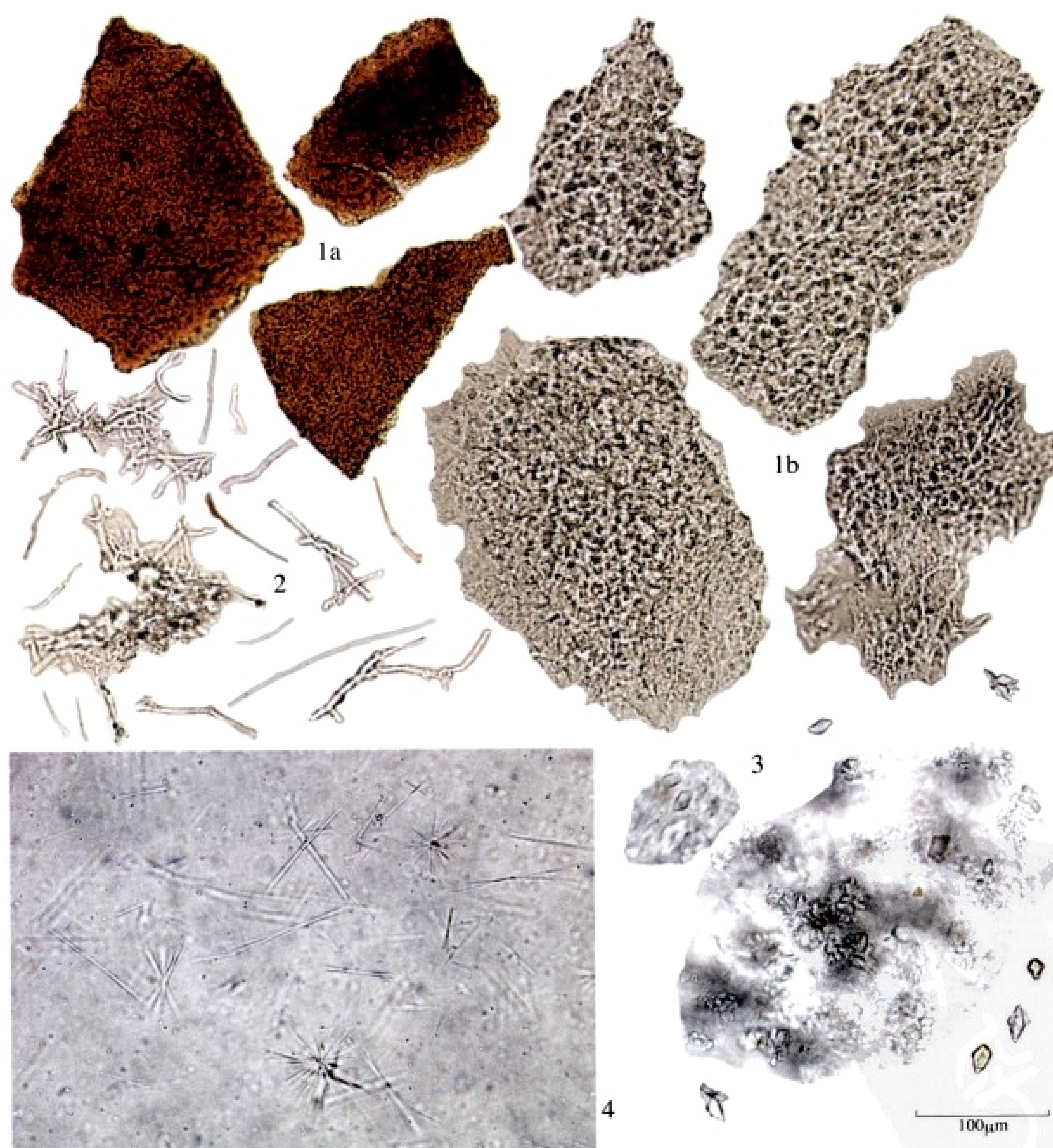


图1 雷丸（*Omphalia lapidescens* 菌核）粉末

[Fig1 Powder of sclerotium from *Omphalia lapidescens*]

1. 菌丝团块[Hyphae masses（a.棕红色Brownish-red b.无色Colourless）] 2. 菌丝（Hyphae） 3. 草酸钙方晶（Prisms of calcium oxalate） 4. 针状结晶（Needle crystals）

路 路 通

Lulutong

FRUCTUS LIQUIDAMBARIS

本品为金缕梅科植物枫香树 *Liquidambar formosana* Hance 的干燥成熟果序。

[显微特征] **本品粉末**：棕褐色。纤维多碎断，直径13～45μm，末端稍钝或钝圆，壁多波状弯曲，木化，胞腔宽或窄，内常含棕黄色物。果皮石细胞类方形、菱形、不规则形或呈分枝状，直径53～398μm，壁极厚，孔沟分枝状。表皮细胞断面观长方形，长34～55μm；表面观多角形，直径6～17μm，壁厚，具孔沟，内含棕黄色物。单细胞非腺毛，常弯曲，长42～126μm，基部宽11～19μm，含棕黄色物。(图1)

Powder: Dark brown. Fibres mostly broken, 13 ~ 45 μm in diameter, the ends subrounded, walls sinuous, lignified, lumina wide or narrow, usually containing yellowish-brown substance. Stone cells of pericarp subsquare, rhombic, irregular or branched, 53 ~ 398 μm in diameter, with heavily thickened walls, pit canals branched. Epidermal cells rectangular in sectional view, 34 ~ 55 μm long, polygonal in surface view, 6 ~ 17 μm in diameter, walls thickened, with pit canals, containing yellowish-brown substance. Unicellular non-glandular hairs curved, 42 ~ 126 μm long, 11 ~ 19 μm in diameter at base, containing yellowish-brown substance. (Fig 1)



图1 路路通（*Liquidambar formosana* 果序）粉末

[Fig1 Powder of infructescence from *Liquidambar formosana*]

1. 纤维（Fibres） 2. 石细胞（Stone cells） 3. 表皮细胞[Epidermal cells（a.断面观Sectional view b.表面观Surface view）] 4. 非腺毛（Non-glandular hairs）

矮 地 茶

Aidicha

HERBA ARDISIAE JAPONICAE

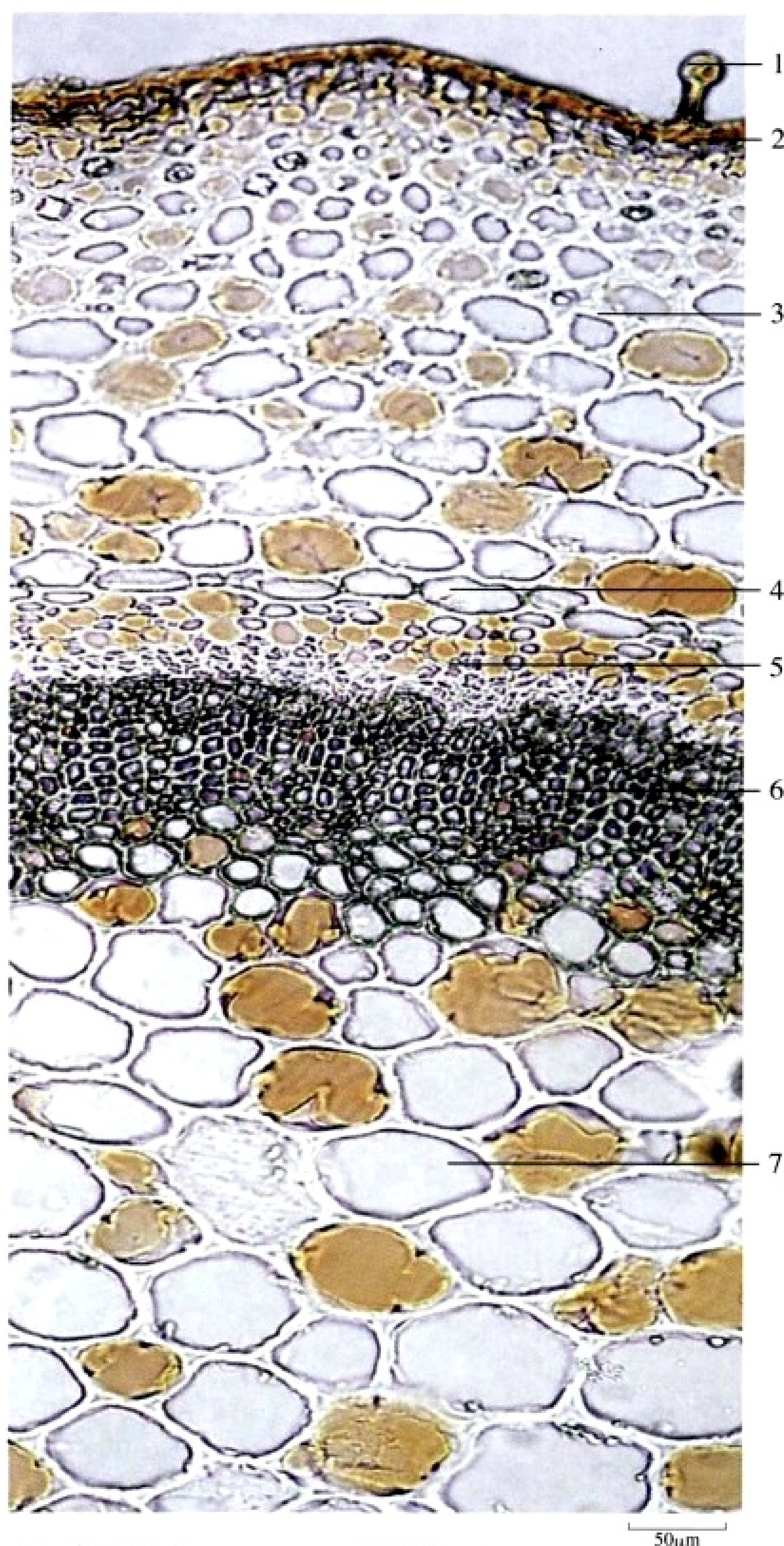


图1 矮地茶（*Ardisia japonica* 茎）横切面

[Fig1 Transverse section of stem from *Ardisia japonica*]

1. 腺毛（Glandular hair） 2. 表皮（Epidermis） 3. 皮层（Cortex） 4. 内皮层（Endodermis） 5. 韧皮部（Phloem） 6. 木质部（Xylem） 7. 髓部（Pith）

本品为紫金牛科植物紫金牛*Ardisia japonica*（Thunb.）Blume的干燥全草。

[显微特征] **本品茎的横切面：**表皮细胞壁厚,有腺毛；老茎可见木栓层。皮层较宽，外层为数列厚角细胞；有的含草酸钙方晶；具分泌腔。内皮层明显。韧皮部甚窄，外侧有少数纤维。形成层环不明显。木质部细胞均木化，导管多单行排列。髓部较大，具分泌腔。薄壁细胞含草酸钙方晶及淀粉粒，有的含棕色物。（图1、2）

Transverse section of stem: Walls of epidermal cells thickened, with glandular hairs; cork visible in old stems. Cortex relatively broad, several layers of collenchymatous cells occurring in the outer part of cortex; some cells containing prisms of calcium oxalate; and scattering secretory cavities. Endodermis distinct. Phloem fairly narrow, a few of fibres at the outside of phloem. Cambium indistinct. Cells of xylem lignified, vessels mostly arranged in single row. Pith relatively large, with secretory cavities. Parenchymatous cells containing prisms of calcium oxalate and starch granules, some containing brown masses. （Fig 1, 2）

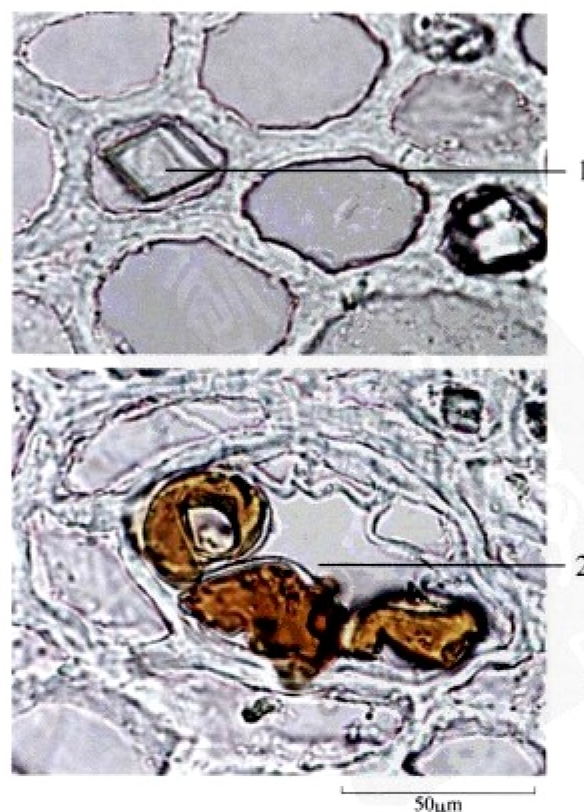


图2 示方晶及分泌腔

[Fig2 Showing prism and secretory cavity]

1. 方晶（Prisms of calcium oxalate） 2. 分泌腔（Secretory cavity）

本品叶表面观：表皮细胞垂周壁波状弯曲；气孔为不等式，偶见不定式。腺鳞头部由8～10个细胞，柄部由1个细胞组成。（图3）

Surface view of leaf: The anticlinal walls of epidermal cells sinuous, stomata anisocytic, and anomocytic occasionally. Glandular scales each with a head consisting of 8～10 cells and an unicellular stalk.（Fig 3）

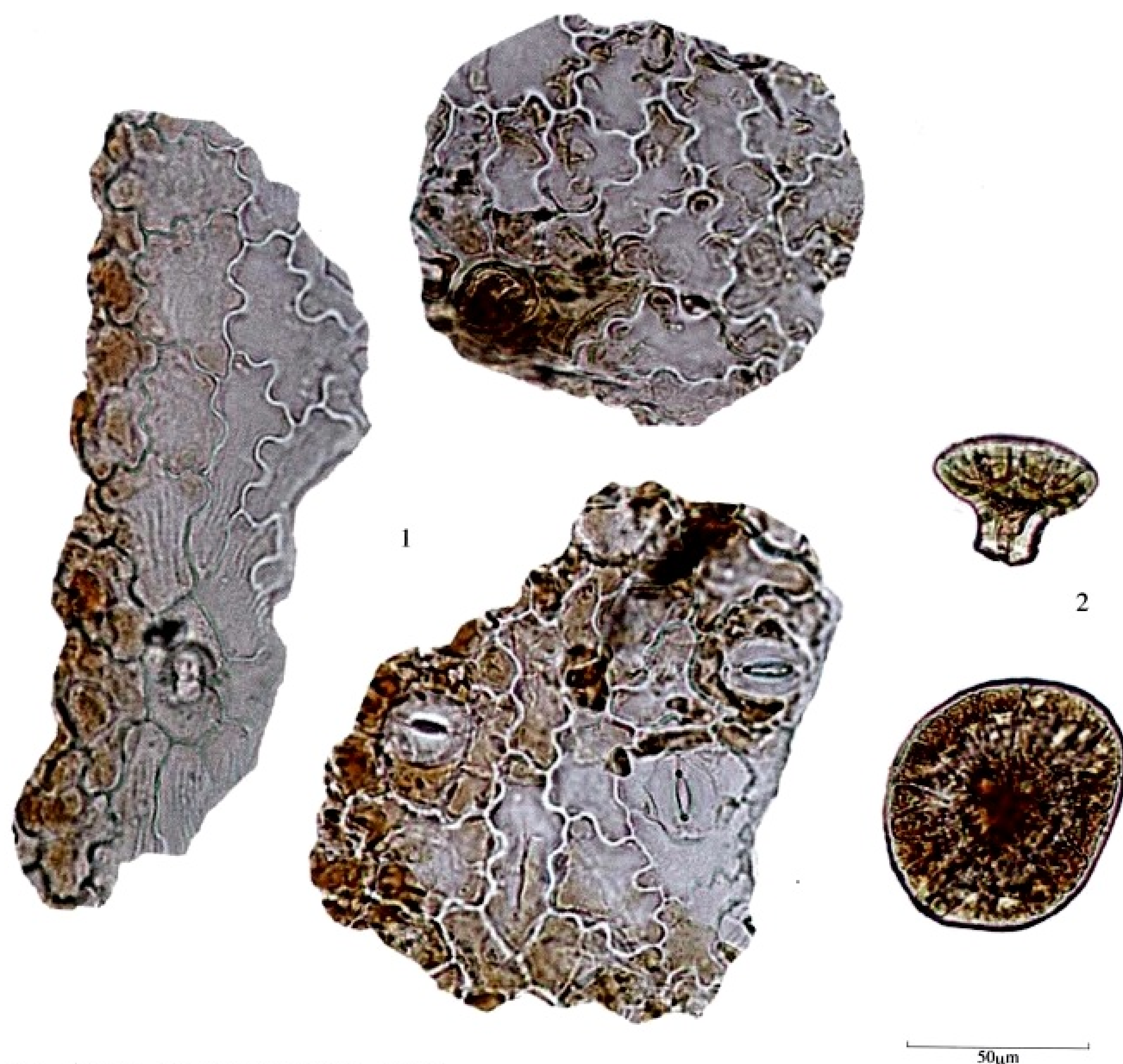


图3 矮地茶（*Ardisia japonica* 叶）表面观

[Fig3 Surface view of leaf from *Ardisia japonica*]

1. 表皮细胞及气孔（Epidermal cells and stomata） 2. 腺鳞（Glandular scales）

本品粉末：棕褐色。螺纹导管较多见，直径7.5～25μm。分泌腔多破碎，有的含黄棕色分泌物，可见内含棕褐色物质的细胞。纤维壁厚。草酸钙方晶直径7.5～26μm。腺毛由单细胞柄和两细胞头组成。气孔为不等式。可见棕色块状物。淀粉粒单粒卵圆形或圆形，直径3.8～23μm，脐点点状或裂缝状；复粒由2～3分粒组成。（图4）

Powder: Dark brown. Spiral vessels relatively frequent, 7.5 ~ 25 μm in diameter. Secretory cavities mostly broken, some cavities containing yellowish-brown secretory contents, and some secretory cells containing brown masses. Fibres thick-walled. Prisms of calcium oxalate 7.5 ~ 26 μm in diameter. Glandular hairs each with a 2-celled head and an unicellular stalk. Stomata anisocytic. Brown masses visible. Single starch granules ovate-rounded or rounded, 3.8 ~ 23 μm in diameter, hilum dotted or cleft; compound granules consisting of 2 ~ 3 components. （Fig 4）

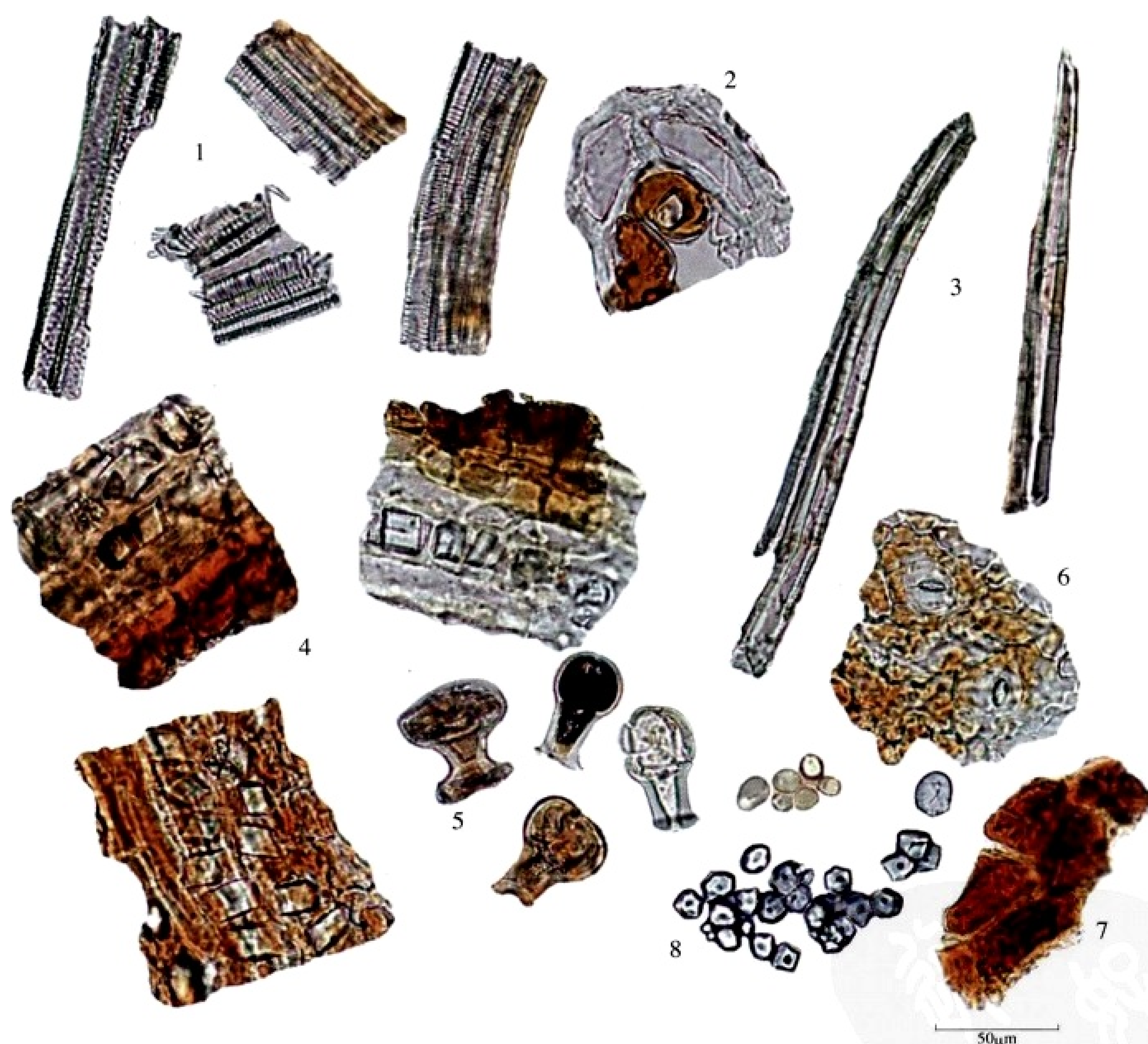


图4 矮地茶（*Ardisia japonica* 全草）粉末

[Fig4 Powder of herb from *Ardisia japonica*]

1. 螺纹导管（Spiral vessels） 2. 分泌腔（Secretory cavities） 3. 纤维（Fibres） 4. 草酸钙方晶（Prisms of calcium oxalate） 5. 腺毛（Glandular hairs） 6. 气孔（Stomata） 7. 棕色块状物（Brown masses） 8. 淀粉粒（Starch granules）

满 山 红
Manshanhong
FOLIUM RHODODENDRI DAURICI

本品为杜鹃花科植物兴安杜鹃*Rhododendron dauricum* L. 的干燥叶。

[显微特征] **本品叶横切面**：上表皮细胞长方形，外被角质层，凹陷处有盾状毛；下表皮细胞近圆形，壁波状，有气孔和盾状毛。栅栏细胞2～3列，海绵细胞类圆形。主脉维管束双韧型，外围有中柱鞘纤维不连续排列成环，上、下表皮内方有厚角细胞多列，叶脉上表面有单细胞非腺毛。薄壁细胞含草酸钙簇晶。（图1～3）

Transverse section of leaf: Upper epidermal cells rectangular, covered with cuticle, bearing peltate hairs at the sunken places; lower epidermal cells subrounded, with sinuous walls, stomata and peltate hair present. Palisade tissue of 2 ~ 3 layers of cells, spongy cells subrounded. Vascular bundle of midrib bicollateral, pericyclic fibres arranged in an interrupted ring, several layers of collenchymatous cells occurring inside the upper and lower epidermis, the upper epidermis of midrib bearing unicellular non-glandular hairs. Parenchymatous cells containing clusters of calcium oxalate. (Fig 1 ~ 3)

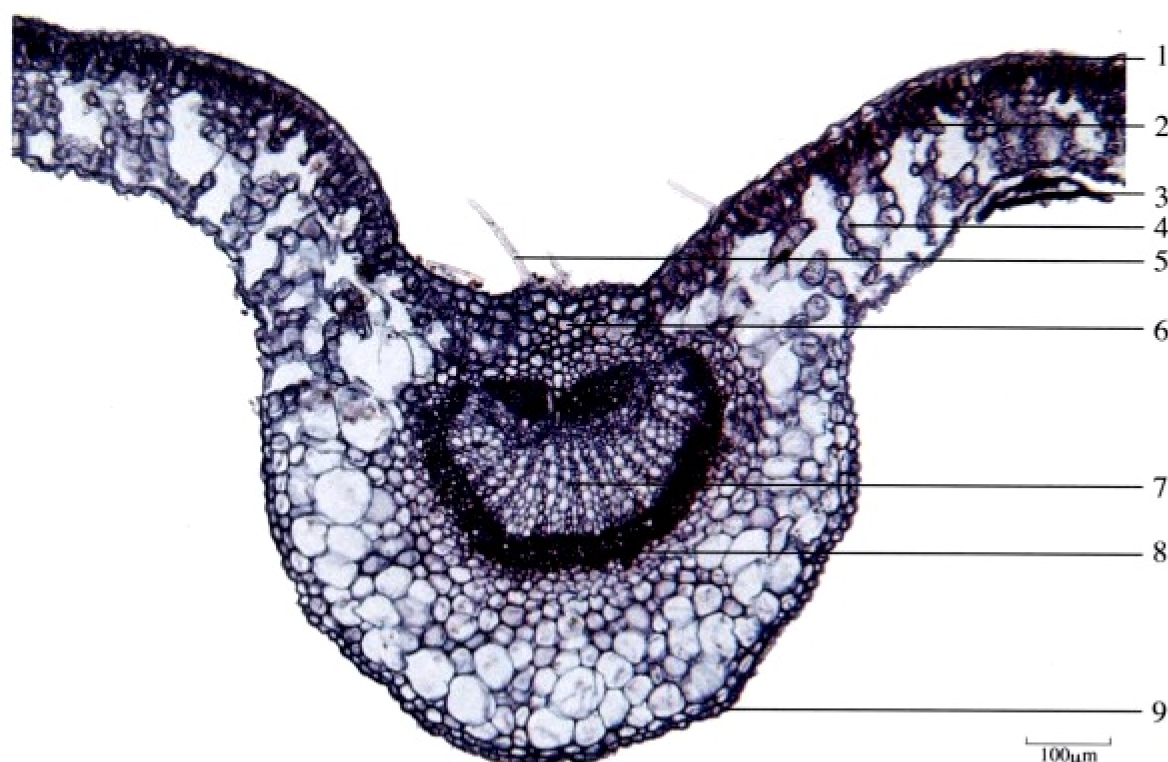


图1 满山红（*Rhododendron dauricum* 叶）横切面

[Fig1 Transverse section of leaf from *Rhododendron dauricum*]

1. 上表皮细胞（Upper epidermal cells） 2. 栅栏组织（Palisade tissue） 3. 盾状毛（Peltate hair） 4. 海绵组织（Spongy tissue） 5. 非腺毛（Non-glandular hairs） 6. 厚角细胞（Collenchymatous cells） 7. 主脉维管束（Vascular bundles of midrib） 8. 中柱鞘纤维（Pericyclic fibres） 9. 下表皮细胞（Lower epidermal cells）



图2 示盾状毛

[Fig2 Showing peltate hair]

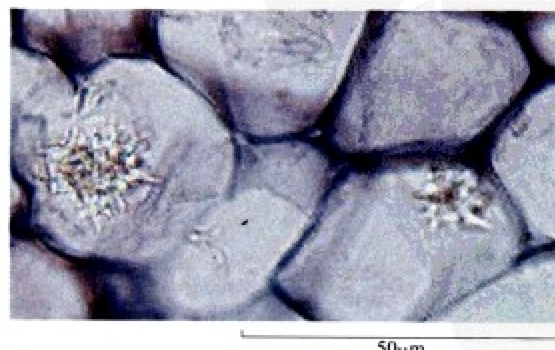


图3 示草酸钙簇晶

[Fig3 Showing clusters of calcium oxalate]

蔓 荆 子

Manjingzi

FRUCTUS VITICIS

本品为马鞭草科植物单叶蔓荆*Vitex trifolia* L. var. *simplicifolia* Cham. 或蔓荆*Vitex trifolia* L. 的干燥成熟果实。

[显微特征] **本品粉末**：灰褐色。花萼表皮细胞类圆形，壁多弯曲；非腺毛2～3细胞，顶端细胞基部稍粗，有疣状突起。外果皮细胞多角形，有角质纹理和毛茸脱落后的痕迹，并有腺毛与非腺毛：腺毛分头部单细胞、柄1～2细胞与头部2～6细胞、柄单细胞两种；非腺毛2～4细胞，长14～200μm，多弯曲，有壁疣。中果皮细胞长圆形或类圆形，壁微木化，纹孔明显。油管多破碎，含分泌物，周围细胞有淡黄色油滴。内果皮石细胞椭圆形或近方形，直径10～35μm。种皮细胞圆形或类圆形，直径42～73μm，壁有网状纹理，木化。（图1）

Powder: Greyish-brown. Epidermal cells of calyx subrounded, walls frequently sinuous; non-glandular hairs 2 ~ 3 celled, apical cells relatively wide at base with warty protrudings. Cells of epicarp polygonal, with cuticular striations and scars of hairs, bearing glandular hairs and non-glandular hairs. Glandular hairs in two types: one with an unicellular head and a 1 ~ 2 celled stalk, and the other with a 2 ~ 6 celled head and an unicellular stalk. Non-glandular hairs 2 ~ 4 celled, 14 ~ 200 μm long, often curved, warty walled. Cells of mesocarp oblong or subrounded, walls slightly lignified, and with distinct pits. Vittae frequently broken, containing secretions, adjacent cells containing pale yellow oil droplets. Stone cells of endocarp elliptical or subsquare,10 ~ 35 μm in diameter. Cells of testa rounded or subrounded, 42 ~ 73 μm in diameter, with reticulate striated and lignified walls. （Fig 1）



图1 蔓荆子（*Vitex trifolia* var. *simplicifolia* 果实） 粉末

[Fig1 Powder of fruit from *Vitex trifolia* var. *simplicifolia*]

1. 花萼表皮细胞（Epidermal cells of calyx） 2. 花萼非腺毛（Non-glandular hairs of calyx） 3. 外果皮细胞（Epicarp cells） 4. 腺毛（Glandular hairs） 5. 外果皮非腺毛（Non-glandular hairs of epicarp） 6. 中果皮细胞（Mesocarp cells） 7. 内果皮石细胞（Stone cells of endocarp） 8. 种皮细胞（Testa cells）

蓼大青叶

Liaodaqingye

FOLIUM POLYGONI TINCTORII

本品为蓼科植物蓼蓝*Polygonum tinctorium* Ait. 的干燥叶。

[显微特征]　本品叶的表面观：表皮细胞多角形，垂周壁平直或微波状弯曲；气孔平轴式，少数不等式。腺毛头部4～8细胞；柄2个细胞并列，亦有多细胞构成多列的。非腺毛多列性，壁木化增厚，常见于叶片边缘及主脉处。叶肉组织含多量蓝色至蓝黑色色素颗粒。草酸钙簇晶多见，直径12～80μm。(图1)

Surface view of leaf: Epidermal cells polygonal, anticlinal walls straight or slightly sinuous; stomata paracytic, a few anomocytic. Glandular hairs each with a 4 ~ 8 celled head and a bicellular or multicellular stalk. Non-glandular hairs multiseriate, with lignified and thickened walls, frequently occurring on the edge and midrib of leaf. Mesophyll tissue containing numerous blue to bluish-black pigment granules. Clusters of calcium oxalate numerous, 12 ~ 80 μm in diameter. (Fig 1)

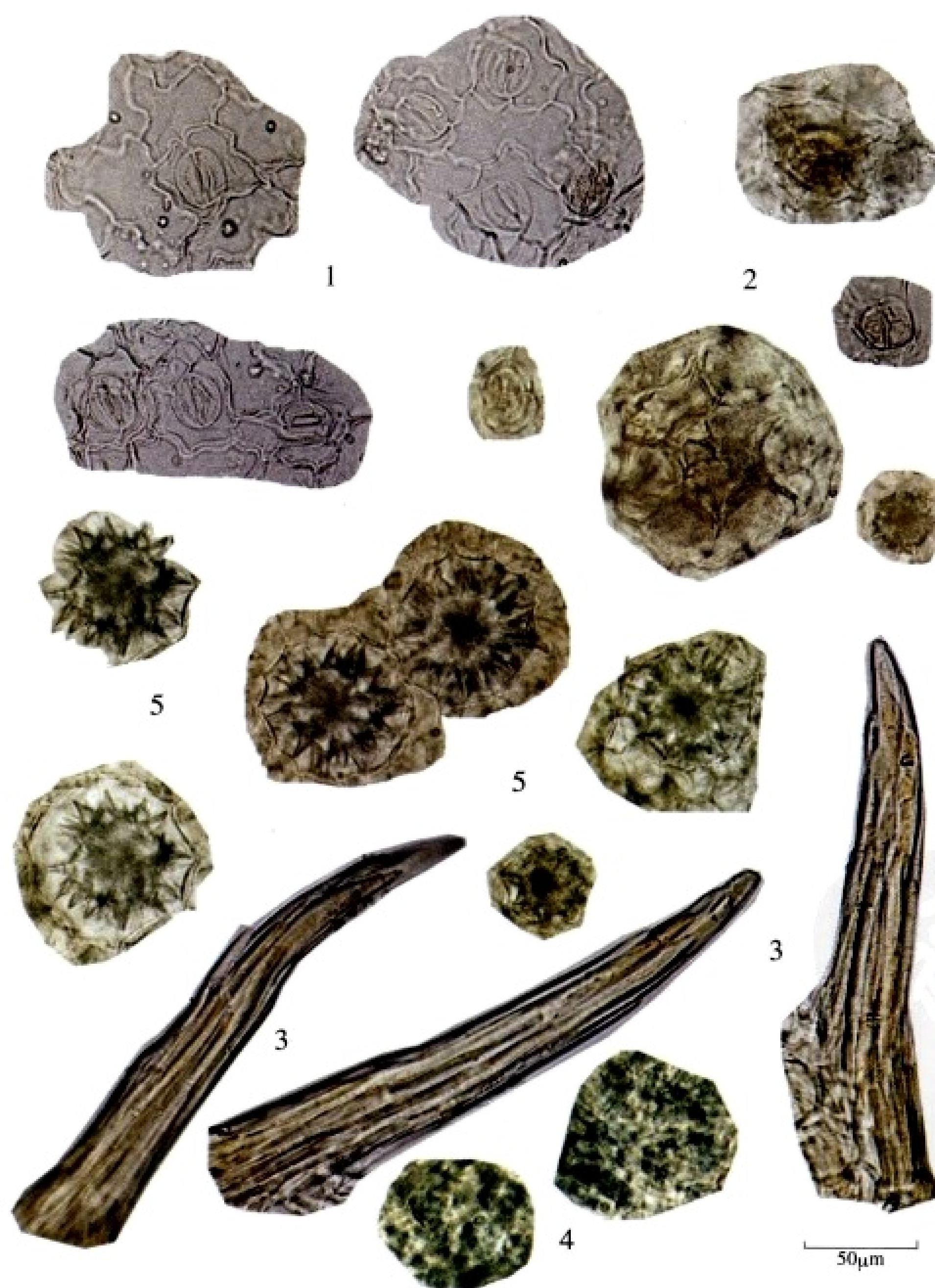


图1　蓼大青叶（*Polygonum tinctorium* 叶）表面观

[Fig1　Surface view of leaf from *Polygonum tinctorium*]

1. 表皮细胞及气孔（Epidermal cells and stomata）　2. 腺毛（Glandular hairs）　3. 非腺毛（Non-glandular hairs）　4. 叶肉细胞含色素颗粒（Mesophyll cells containing pigment granules）　5. 草酸钙簇晶（Clusters of calcium oxalate）

槟　榔

Binglang

SEMEN ARECAE

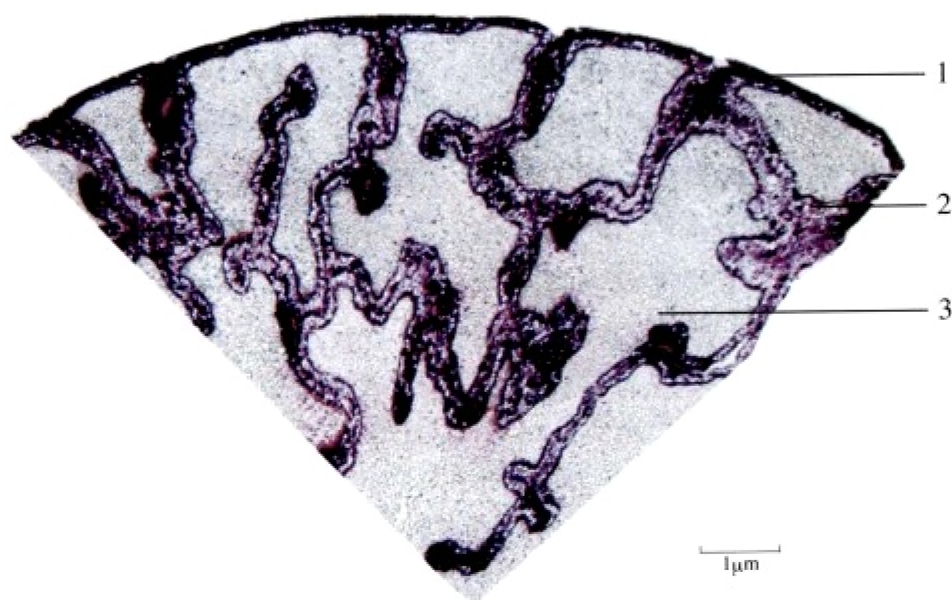


图1　槟榔（*Areca catechu* 种子）横切面

[Fig1　Transverse section of seed from *Areca catechu*]

1. 种皮（Testa）　2. 外胚乳（Perisperm）　3. 内胚乳（Endosperm）

本品为棕榈科植物槟榔*Areca catechu* L. 的干燥成熟种子。

[显微特征]　本品横切面：种皮组织分内、外层，外层为数列切向延长的扁平石细胞，内含红棕色物，石细胞形状、大小不一，常有细胞间隙；内层为数列薄壁细胞，含棕红色物，并散有少数维管束。外胚乳较狭窄，种皮内层与外胚乳常插入内胚乳中，形成错入组织；内胚乳细胞白色，多角形，壁厚，纹孔大，含油滴及糊粉粒。（图1、2）

Transverse section: Outer layers of testa consisting of several layers of flattened stone cells, elongated tangentially, containing reddish-brown contents, stone cells varying in shape and size, often having intercellular space; inner layers of testa consisting of several layers of parenchymatous cells, containing reddish-brown contents, and a few vascular bundles scattered. Perisperm relatively narrow; inner layers of testa and perisperm often inserting into endosperm, forming crisscross tissue. Endosperm cells white, polygonal, walls thickened, pits large, containing oil droplets and aleurone grains. (Fig 1,2)



图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 种皮外层（Outer layers of testa）　2. 种皮内层（Inner layers of testa）　3. 外胚乳细胞（Perisperm cells）　4. 维管束（Vascular bundles）　5. 内胚乳细胞（Endosperm cells）

焦 槟 榔

Jiaobinglang

SEMEN ARECAE PRAEPARETA

本品为槟榔*Areca catechu* L. 干燥成熟种子的炮制加工品。

[显微特征] **本品粉末**：焦黄色。内胚乳细胞极多，多破碎，无色，完整者呈不规则多角形或类方形，胞间层不甚明显，直径56～112μm，壁厚6～11μm，纹孔较多，甚大，类圆形或矩圆形，直径8～19μm。外胚乳细胞呈类方形、类多角形或作长条状，直径40～72μm，壁稍厚，孔沟可察见，胞腔内大多数充满红棕色至深棕色物。种皮石细胞呈纺锤形、多角形或长条形，直径24～64μm，壁厚5～12μm，淡黄棕色，纹孔少数，裂缝状，有的胞腔内充满红棕色物。螺纹及网纹导管偶见，直径8～16μm。(图1)

Powder: Charred yellow. Endosperm cells extremely numerous, mostly broken, colourless, irregular polygonal or subsquare when whole, intercellular layers somewhat indistinct, 56～112 μm in diameter, walls 6～11 μm thick, pits relatively numerous and large, subrounded or rectangle-rounded, 8～19 μm in diameter. Perisperm cells subsquare, subpolygonal or strip-shaped, 40～72 μm in diameter, walls slightly thickened, pit-canals visible, most lumina filled with reddish-brown to dark brown substance. Stone cells of testa spindle-shaped, polygonal or slat-shaped, 24～64 μm in diameter, walls 5～12 μm thick, pale yellowish-brown, pits few, slit-like, some lumina filled with reddish-brown substance. Spiral or reticulate vessels occasionally visible, 8～16 μm in diameter. (Fig 1)



图1 焦槟榔（*Areca catechu* 种子加工品）粉末

[Fig1 Powder of charred seed from *Areca catechu*]

1. 内胚乳细胞 (Endosperm cells) 2. 外胚乳细胞 (Perisperm cells) 3. 石细胞 (Stone cells) 4. 导管 (Vessels)

酸 枣 仁

Suanzaoren

SEMEN ZIZIPHI SPINOSAE

本品为鼠李科植物酸枣*Ziziphus jujuba* Mill. var. *spinosa*（Bunge）Hu ex H. F. Chou 的干燥成熟种子。

[显微特征] **本品粉末：**棕红色。种皮栅状细胞棕红色，表面观多角形，直径约15μm，壁厚，木化，胞腔小；侧面观呈长条形，外壁增厚，侧壁上、中部甚厚，下部渐薄；底面观类多角形或圆多角形。种皮内表皮细胞棕黄色，表面观长方形或类方形，垂周壁连珠状增厚，木化。子叶表皮细胞含细小草酸钙簇晶及方晶。（图1）

Powder: Brownish-red. Palisade cells of testa brownish-red, polygonal in surface view, about 15 μm in diameter, with thickened and lignified walls, lumina small; long slat-shaped in lateral view, with thickened outer wall and the walls much thickened in upper and middle parts and gradually thinned towards lower parts; subpolygonal or rounded polygonal in bottom surface view. Cells of endopleura brownish-yellow, rectangular or subsquare with beaded and lignified anticlinal walls in surface view. Epidermal cells of cotyledon containing fine clusters or prisms of calcium oxalate.（Fig 1）



图1 酸枣仁（*Ziziphus jujuba* var. *spinosa* 种子） 粉末

[Fig1 Powder of seed from *Ziziphus jujuba* var. *spinosa*]

1. 种皮栅状细胞[Palisade cells of testa（a. 侧面观Lateral view b. 表面观Surface view c. 底面观 Bottom surface view）] 2. 种皮内表皮细胞（Cells of endopleura） 3. 子叶表皮细胞（Epidermal cells of cotyledon）

罂　粟　壳

Yingsuqiao

PERICARPIUM PAPAVERIS

本品为罂粟科植物罂粟 *Papaver somniferum* L. 的干燥成熟果壳。

［显微特征］　本品粉末：黄白色。果皮外表皮细胞表面观类多角形或类方形，直径20～50μm，壁厚，有的胞腔内含淡黄色物。果皮内表皮细胞表面观长多角形、长方形或长条形，直径20～65μm，长25～230μm，垂周壁厚，纹孔及孔沟明显，有的可见层纹。果皮薄壁细胞类圆形或长圆形，壁稍厚。导管多为网纹或螺纹，直径10～70μm。韧皮纤维长梭形，直径20～30μm，壁稍厚，斜纹孔明显，有的纹孔相交成人字形或十字形。乳汁管长条形，壁稍厚，内含淡黄色物。（图1）

Powder: Yellowish-white. The outer epidermal cells of pericarp subpolygonal or subsquare in surface view, 20 ~ 50 μm in diameter, walls thickened, some lumina containing pale yellow contents. The inner epidermal cells of pericarp elongated polygonal, rectangular or slender in surface view, 20 ~ 65 μm in diameter, 25 ~ 230 μm long, anticlinal walls thickened, pits and pit canals distinct, sometimes striations visible. Parenchymatous cells of pericarp subrounded or oblong, walls slightly thickened. Vessels mostly reticulated or spiral, 10 ~ 70 μm in diameter. Phloem fibres elongated fusiform, 20 ~ 30 μm in diameter, walls slightly thickened, oblique pits distinct, some pits intersected into V-shaped or cross-shaped. Laticiferous tubes slat-shaped, walls thickened, containing pale yellow contents. (Fig 1)

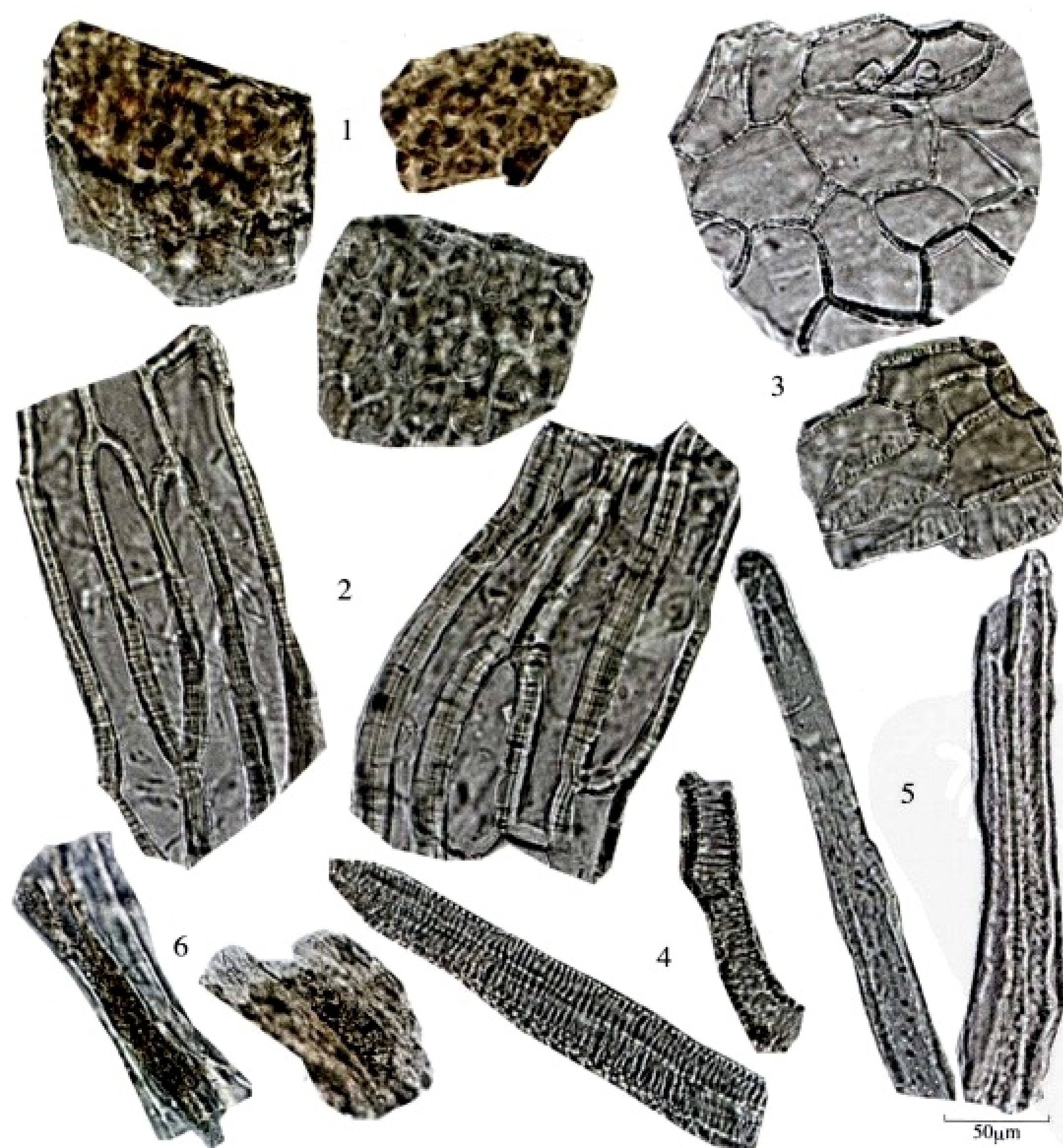


图1　罂粟壳（*Papaver somniferum* 果壳）粉末

[Fig1　Powder of pericarp from *Papaver somniferum*]

1. 果皮外表皮细胞（Outer epidermal cells of pericarp）　2. 果皮内表皮细胞（Inner epidermal cells of pericarp）　3. 果皮薄壁细胞（Parenchymatous cells of pericarp）　4. 导管（Vessels）　5. 韧皮纤维（Phloem fibres）　6. 乳汁管（Laticiferous tubes）

漏　　芦

Loulu

RADIX RHAPONTICI

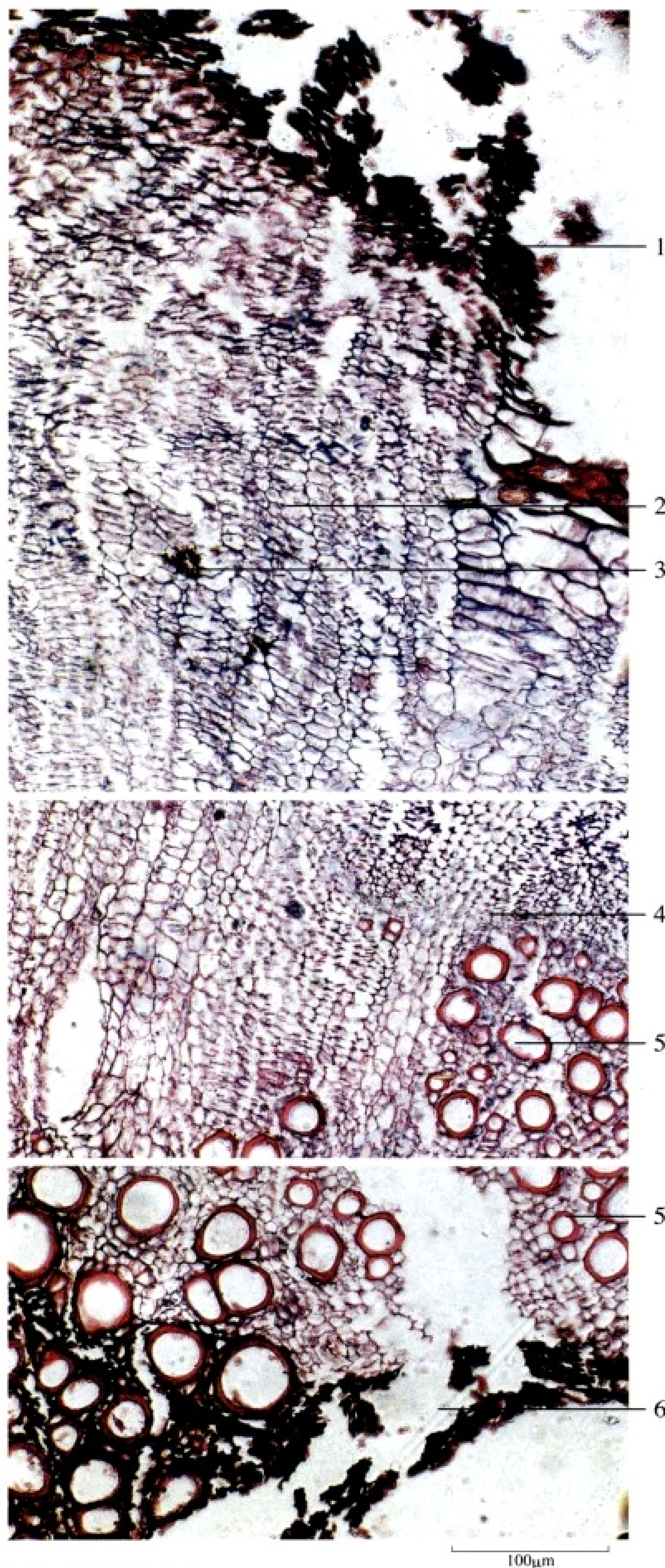


图2　局部组织放大
[Fig2　Partial tissue magnified]
1. 后生皮层（Metaderm）　2. 韧皮部（Phloem）　3. 分泌管（Secretory canals）　4. 形成层（Cambium）　5. 木质部（Xylem）　6. 裂隙（Cracks）

本品为菊科植物祁州漏芦 *Rhaponticum uniflorum*（L.）DC. 的干燥根。

［显微特征］　本品横切面：表皮常已脱落，后生皮层为数层至20余层棕色细胞，壁稍厚，木化及木栓化。韧皮部较宽广，射线宽。形成层成环。木质部导管较多，大型导管群常与小型导管群相间排列；木射线常有径向裂隙，中央有时呈星状裂隙，其周围的细胞壁木栓化。薄壁组织中有分泌管分布，内含红棕色分泌物。（图1、2）

Transverse section: Epidermis mostly falled off. Metaderm of several to 20 or more layers of brown cells with slightly thicked, lignified or suberized walls. Phloem relatively broad, rays wide. Cambium in a ring. Xylem vessels abundant, the large vessel groups alternated with the small vessel groups, rays often with radial cracks, sometimes stellate clefts at centre surrounded by suberized cells. Parenchyma possessing secretory canals containing reddish-brown secretion. (Fig 1, 2)

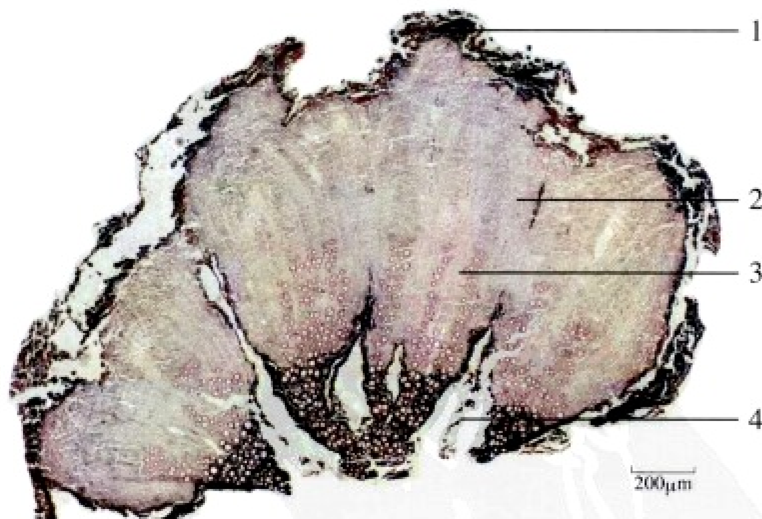


图1　漏芦（*Rhaponticum uniflorum* 根）横切面
[Fig1　Transverse section of root from *Rhaponticum uniflorum*]
1. 后生皮层（Metaderm）　2. 韧皮部（Phloem）　3. 木质部（Xylem）　4. 裂隙（Cracks）

本品粉末：棕色。网纹导管和具缘纹孔导管较多，直径约至133μm。分泌管长条状，直径24～68μm，内含红棕色分泌物。根头部非腺毛细胞甚长，木化，长0.5～4mm，直径20～30μm。后生皮层细胞类方形或长方形，壁稍厚，红棕色，木化及木栓化。(图3)

Powder: Brown. Reticulate and bordered pitted vessels abundant, about 133 μm in diameter. Secretory canals slat-shaped, 24～68 μm in diameter, containing reddish-brown secretion. Non-glandular hairs of root stock lignified, 0.5～4 mm long, 20～30 μm in diameter. Cells of metaderm subsquare or rectangular, walls slightly thickened, reddish-brown, lignified or suberized. (Fig 3)



图3 漏芦（*Rhaponticum uniflorum* 根）粉末

[Fig3 Powder of root from *Rhaponticum uniflorum*]

1. 导管（Vessels） 2. 分泌管（Secretory canals） 3. 非腺毛（Non-glandular hairs） 4. 后生皮层细胞（Metaderm cells）

槲　寄　生

Hujisheng

HERBA VISCI

本品为桑寄生科植物槲寄生*Viscum coloratum*（Komar.）Nakai的干燥带叶茎枝。

[显微特征]　本品茎的横切面：表皮细胞长方形，外被黄绿色角质层，厚19～60μm。皮层较宽；纤维数十个成束，微木化；老茎石细胞甚多，单个散在或数个成群，韧皮部较窄，老茎散有石细胞。形成层不明显。木质部散有纤维束；导管周围纤维甚多，并有少数异形细胞。髓明显。薄壁细胞含草酸钙簇晶及少数方晶。（图1、2）

Transverse section of stem: Epidermal cells rectangular, the outer walls covered with yellowish-green cuticle, 19～60 μm thick. Cortex relatively broad, fibres several tens in bundles, slightly lignified; stone cells in old stem numerous, scattered singly or in groups. Phloem relatively narrow, with stone cells scattered in old stem. Cambium indistinct. Xylem with scattered fibre bundles; vessels surrounded by numerous fibres and a few heterogeneous cells. Pith distinct. Parenchymatous cells containing clusters of calcium oxalate and a few prisms （Fig 1, 2）

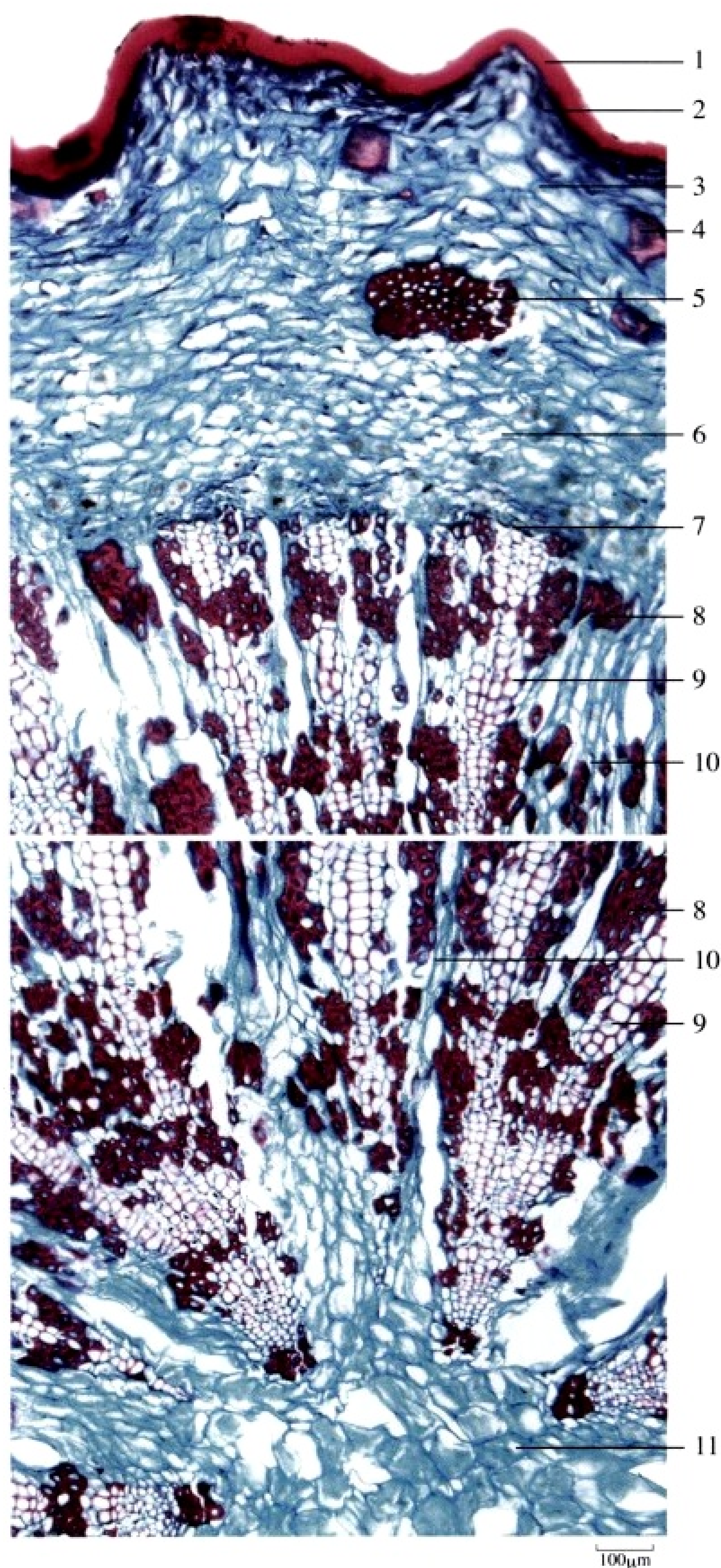


图1　槲寄生（*Viscum coloratum* 茎）横切面

[Fig 1 Transverse section of stem from *Viscum coloratum*]

1. 角质层（Cuticle）　2. 表皮（Epidermis）　3. 皮层（Cortex）　4. 石细胞（Stone cells）　5. 纤维束（Fibres bundles）　6. 韧皮部（Phloem）　7. 形成层（Cambium）8.纤维束（Fibre bundles）　9. 木质部（Xylem）　10. 木射线（Xylem rays）　11. 髓（Pith）

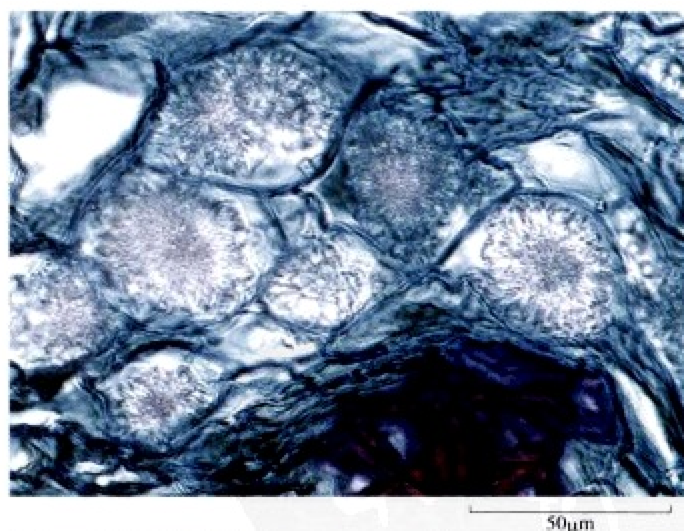


图2　示草酸钙簇晶

[Fig 2 Showing clusters of calcium oxalate]

本品茎的粉末：淡黄色。表皮碎片黄绿色，细胞类长方形，可见气孔。纤维成束，直径10～34μm，壁较厚，略成波状，微木化。异形细胞形状不规则，壁较厚，微木化，胞腔大。草酸钙簇晶直径17～45μm；方晶较少，直径 8～30μm。石细胞类方形、类多角形或不规则形，直径42～102μm。（图3）

Powder of stem: Pale yellow. Fragments of epidermis yellowish-green, cells subsquare, stomata visible. Fibres in bundles, 10～34μm in diameter, walls relatively thickened, somewhat sinuous and slightly lignified. Heterogeneous cells irregular, walls relatively thickened, slightly lignified, with big lumina. Clusters of calcium oxalate 17～45μm in diameter; prisms few, 8～30 μm in diameter. Stone cells subsquare, subpolygonal or irregular, 42～102 μm in diameter. (Fig 3)



图3 槲寄生（*Viscum coloratum* 茎）粉末

[Fig3 Powder of stem from *Viscum coloratum*]

1. 表皮细胞（Epidermal cells） 2. 纤维（Fibres） 3. 异形细胞（Heterogeneous cells） 4. 草酸钙簇晶（Clusters of calcium oxalate） 5. 草酸钙方晶（Prisms of calcium oxalate） 6. 石细胞（Stone cells）

墨旱莲

Mohanlian

HERBA ECLIPTAE

本品为菊科植物鳢肠*Eclipta prostrata* L. 的干燥地上部分。

[显微特征]　本品叶的表面观： 非腺毛多为3细胞，长260～700μm，基部细胞稍膨大，中部细胞较长，壁增厚，有明显疣状突起，顶端细胞急尖而短，近三角形。气孔不定式，副卫细胞3～4个。（图1）

Surface view of leaf: Non-glandular hairs frequently 3-celled, 260 ~ 700 μm long, basal cells slightly inflated, middle cells relatively long, walls thickened with distinct warty protrudings, apical cells sharply acute and short, subtriangular. Stomata anomocytic, with 3 ~ 4 subsidiary cells. (Fig 1)



图1　墨旱莲（*Eclipta prostrata* 叶）表面观

[Fig1　Surface view of leaf from *Eclipta prostrata*]

1. 非腺毛（Non-glandular hairs）　2. 表皮细胞及气孔（Epidermal cells and stomata）

僵　　蚕

Jiangcan

BOMBYX BATRYTICATUS

本品为蚕蛾科昆虫家蚕*Bombyx mori* Linnaeus 4～5龄的幼虫感染（或人工接种）白僵菌*Beauveria bassiana*（Bals.） Vuillant 而致死的干燥体。

[显微特征]　**本品粉末**：灰棕色或灰褐色。菌丝近无色，细长，卷曲缠结在体壁中。气管壁碎片略弯曲或呈弧状，具棕色或深棕色的螺旋丝。表皮组织表面具网格样皱缩纹理以及纹理突起形成的小尖突，有圆形毛窝，边缘黄色；刚毛黄色或黄棕色，表面光滑，壁稍厚。未消化的桑叶组织中大多含草酸钙簇晶或方晶。(图1)

Powder: Greyish-brown. The hyphae almost colourless, slender rolled and twisted in the body walls. Broken pieces of the trachea walls slightly curved or arch-like, with brown or dark brown spiral filaments. The surface of the epidermis with reticulated shrunken striations and small pointed projections formed by the striations; with rounded setae pits, the margin of the pits yellow. Setae yellow or yellowish-brown, surface smooth, walls slightly thickened. The indigested tissues of mulberry leaf mostly containing clusters or prisms of calcium oxalate. （Fig 1）



图1　僵蚕（*Bombyx mori* 感染白僵菌而致死的全体）粉末

[Fig1　Powder of the infected bodies from *Bombyx mori*]

1. 菌丝（Mycelia）　2. 气管壁碎片（Broken pieces of the trachea walls）　3. 表皮及圆形毛窝（Epidermis and rounded setae pits）　4. 刚毛（Setae）　5. 未消化桑叶组织（Indigested tissue of mulberry leaf）

鹤　虱

Heshi

FRUCTUS CARPESII

本品为菊科植物天名精*Carpesium abrotanoides* L. 的干燥成熟果实。

[显微特征]　本品横切面：外果皮细胞1列，均含草酸钙柱晶。中果皮薄壁细胞数列，棕色，细胞皱缩，界限不清楚，棱线处有纤维束，由数十个纤维组成，纤维壁厚，木化。内果皮细胞1列，深棕色。种皮细胞扁平，内胚乳有残存；胚薄壁细胞充满糊粉粒及脂肪油滴，子叶最外层细胞含细小的草酸钙结晶。（图1、2）

Transverse section: Epicarp consisting of 1 layer of cells, each containing columnar crystals of calcium oxalate. Mesocarp consisting of several layers of brown parenchymatous cells, shrunken with indistinct walls, fibre bundles occurring at ribs, consisting of over 10 fibres with thickened and lignified walled. Endocarp of 1 layer of dark brown cells. Cells of testa flattened, endosperm remained; parenchymatous cells of embryo filled with aleurone grains and fatty oil droplets, the outmost layer cells of cotyledon containing fine crystals of calcium oxalate. （Fig 1, 2）

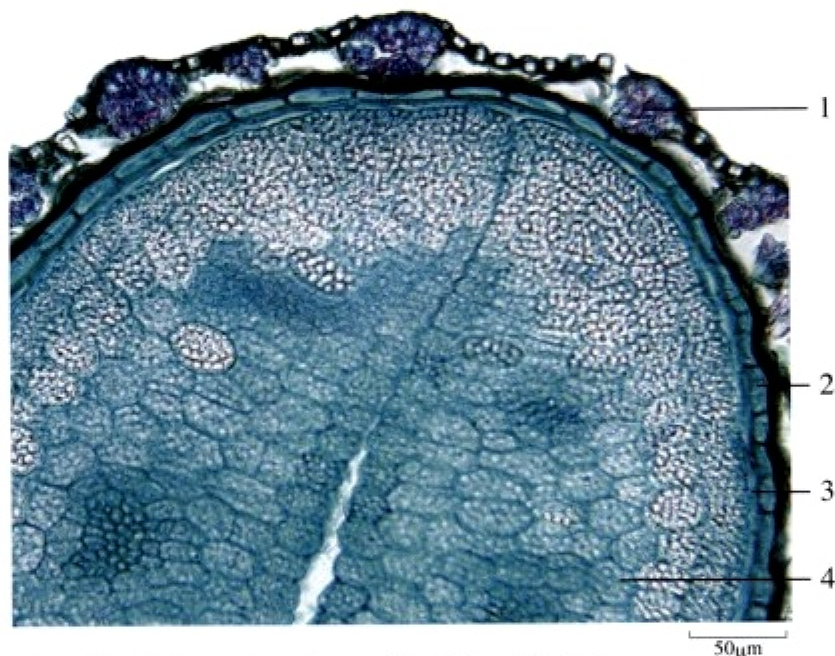


图1　鹤虱（*Carpesium abrotanoides* 果实）横切面

[Fig1　Transverse section of fruit from *Carpesium abrotanoides*]

1. 果皮 （Pericarp）　2.种皮（Testa）　3. 内胚乳（Endosperm）　4. 子叶（Cotyledon）

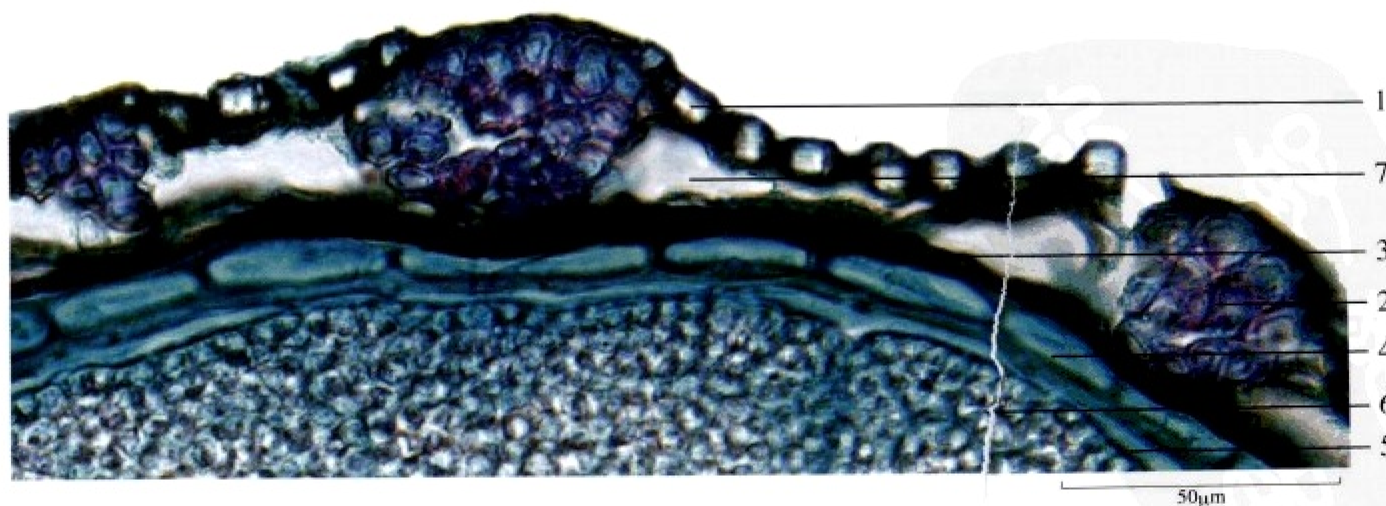


图2　局部组织放大

[Fig2　Partial tissue magnified]

1. 外果皮含晶细胞（Crystal-containing cells of epicarp）　2. 中果皮纤维束（Fibre bundles of mesocarp）　3. 内果皮细胞（Endocarp cells）　4. 种皮细胞（Testa cells）　5. 残存内胚乳（Remains of endosperm）　6. 子叶细胞（Cotyledon cells）　7. 中果皮薄壁细胞（Parenchymatous cells of mesocarp）

薏　苡　仁

Yiyiren

SEMEN COICIS

本品为禾本科植物薏苡 *Coix lacryma-jobi* L. var. *ma-yuen*（Roman.） Stapf 的干燥成熟种仁。

[显微特征]　**本品粉末**：淡类白色。主为淀粉粒，单粒类圆形或多面形，直径2～20μm，脐点星状；复粒少见，一般由2～3分粒组成。(图1)

Powder: Pale whitish. Starch granules numerous, simple granules subrounded or polyhedral, 2～20μm in diameter, hilum stellate; compound granules seldom visible, usually consisting of 2～3 components. (Fig 1)

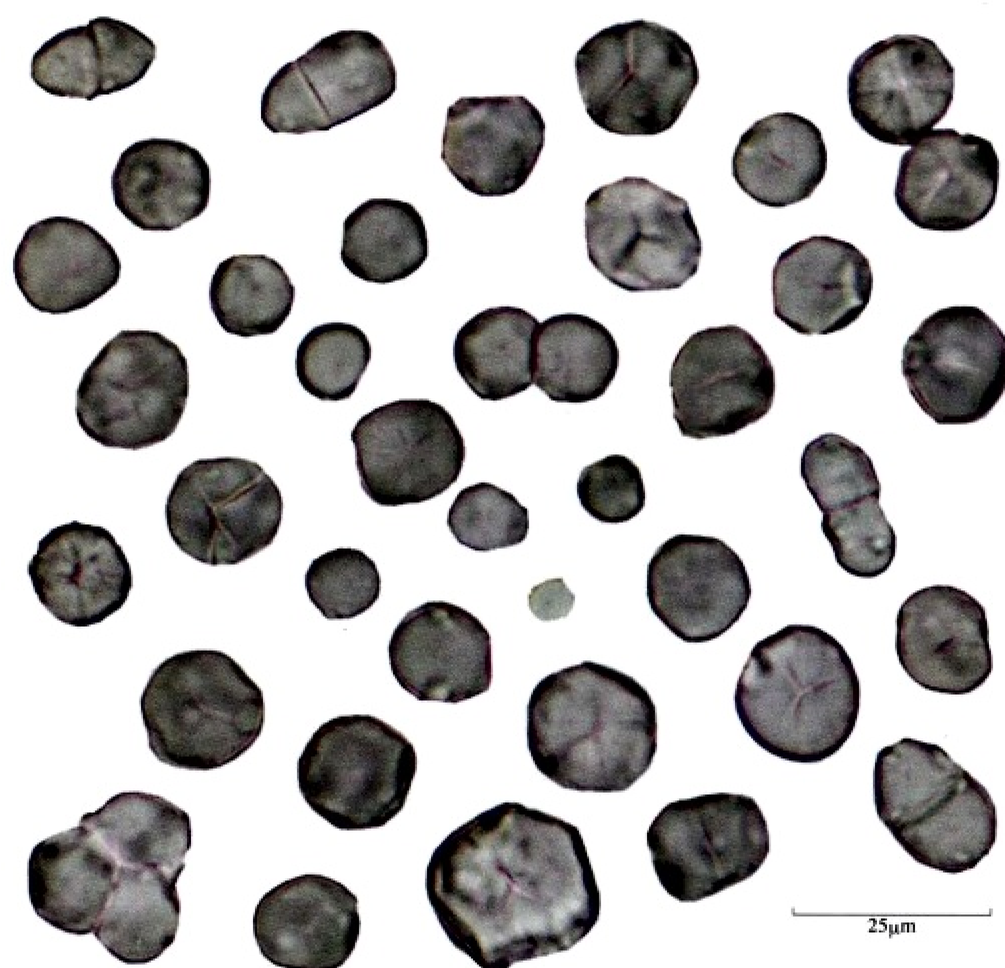


图1　薏苡仁（*Coix lacryma-jobi* var. *ma-yuen* 种仁） 粉末

[Fig1　Powder of kernel from *Coix lacryma-jobi* var. *ma-yuen*]

薄　荷

Bohe

HERBA MENTHAE

本品为唇形科植物薄荷*Mentha haplocalyx* Briq. 的干燥地上部分。

[显微特征]　**本品叶表面观：**腺鳞头部8细胞，直径约至90μm，柄单细胞；小腺毛头部及柄部均为单细胞。非腺毛1～8细胞，常弯曲，壁厚，微具疣状突起。下表皮气孔多见，直轴式。（图1）

Surface view of leaf: Glandular scales each with a 8-celled head, up to 90 μm in diameter, and an unicellular stalk; small glandular hairs each with an unicellular head and an unicellular stalk. Non-glandular hairs 1～8 celled, often curved, walls thickened, and slightly warty. Stomata diacytic, numerous on the lower surface of leaf. (Fig 1)



图1　薄荷（*Mentha haplocalyx* 叶）表面观

[Fig1　Surface view of leaf from *Mentha haplocalyx*]

1. 表皮细胞及腺鳞（Epidermal cells and glandular scales）　2. 小腺毛（Small glandular hairs）　3. 非腺毛（Non-glandular hairs）　4. 下表皮细胞与气孔（Lower epidermal cells and stomata）

颠　茄　草

Dianqiecao

HERBA BELLADONNAE

本品为茄科植物颠茄 *Atropa belladonna* L. 的干燥全草。

[显微特征]　本品粉末：浅绿色或浅棕绿色。草酸钙砂晶甚多，直径3～10μm，含砂晶细胞中有的可见簇晶，直径15～28μm。叶表皮细胞垂周壁波状弯曲，具角质条纹；气孔不等式。腺毛头部单细胞、柄2～4细胞或头部5～6细胞、柄单细胞。淀粉粒稀少，直径8～26μm。具缘纹孔及网纹导管，直径24～40μm。亦可见木纤维、波状弯曲的种皮石细胞与花粉粒等。（图1）

Powder: Pale green or pale brownish-green. Sandy crystals of calcium oxalate numerous, 3 ~ 10 μm in diameter, some mixed with cluster crystals, 15 ~ 28 μm in diameter. Leaf epidermal cells with sinuous anticlinal walls and cuticular striations; stomata anisocytic. Glandular hairs, each with an unicellular head and a 2 ~ 4 celled stalk, or with a 5 ~ 6 celled head and an unicellular stalk. Starch granules sparse, 8 ~ 26 μm in diameter. Bordered pitted and reticulate vessels, 24 ~ 40 μm in diameter. Wood fibres, sinuous stone cells of testa and pollen grains visible.（Fig 1）



图1　颠茄草（*Atropa belladonna* 全草）粉末

[Fig1　Powder of herb from *Atropa belladonna*]

1. 含砂晶细胞（Cells containing sandy crystals）　2. 叶表皮细胞及气孔（Leaf epidermal cells and stomata）
3. 腺毛（Glandular hairs）　4. 淀粉粒（Starch granules）　5. 导管（Vessels）　6. 木纤维（Wood fibres）
7. 种皮石细胞（Stone cells of testa）　8. 花粉粒（Pollen grains）

橘　　红

Juhong

EXOCARPIUM CITRI RUBRUM

本品为芸香科植物橘 *Citrus reticulata* Blanco 及其栽培变种的干燥外层果皮。

[显微特征]　本品粉末：淡黄棕色。果皮表皮细胞表面观多角形、类方形或长方形，垂周壁增厚，气孔类圆形，直径18～26μm，副卫细胞不清晰；侧面观外被角质层，径向壁的外侧增厚。油室碎片的外围薄壁细胞壁微增厚。草酸钙方晶成片存在于薄壁组织中。（图1）

Powder: Pale yellowish-brown. Epidermal cells of pericarp polygonal, subsquare or rectangular in surface view, anticlinal walls thickened, stomata subrounded, 18 ~ 26 μm in diameter, subsidiary cells indistinct; covered with cuticle and the outer part of radial walls thickened in lateral view. The walls of parenchymatous cells of fragments of oil cavities slightly thickened. Parenchymatous cells containing prisms of calcium oxalate. （Fig 1）

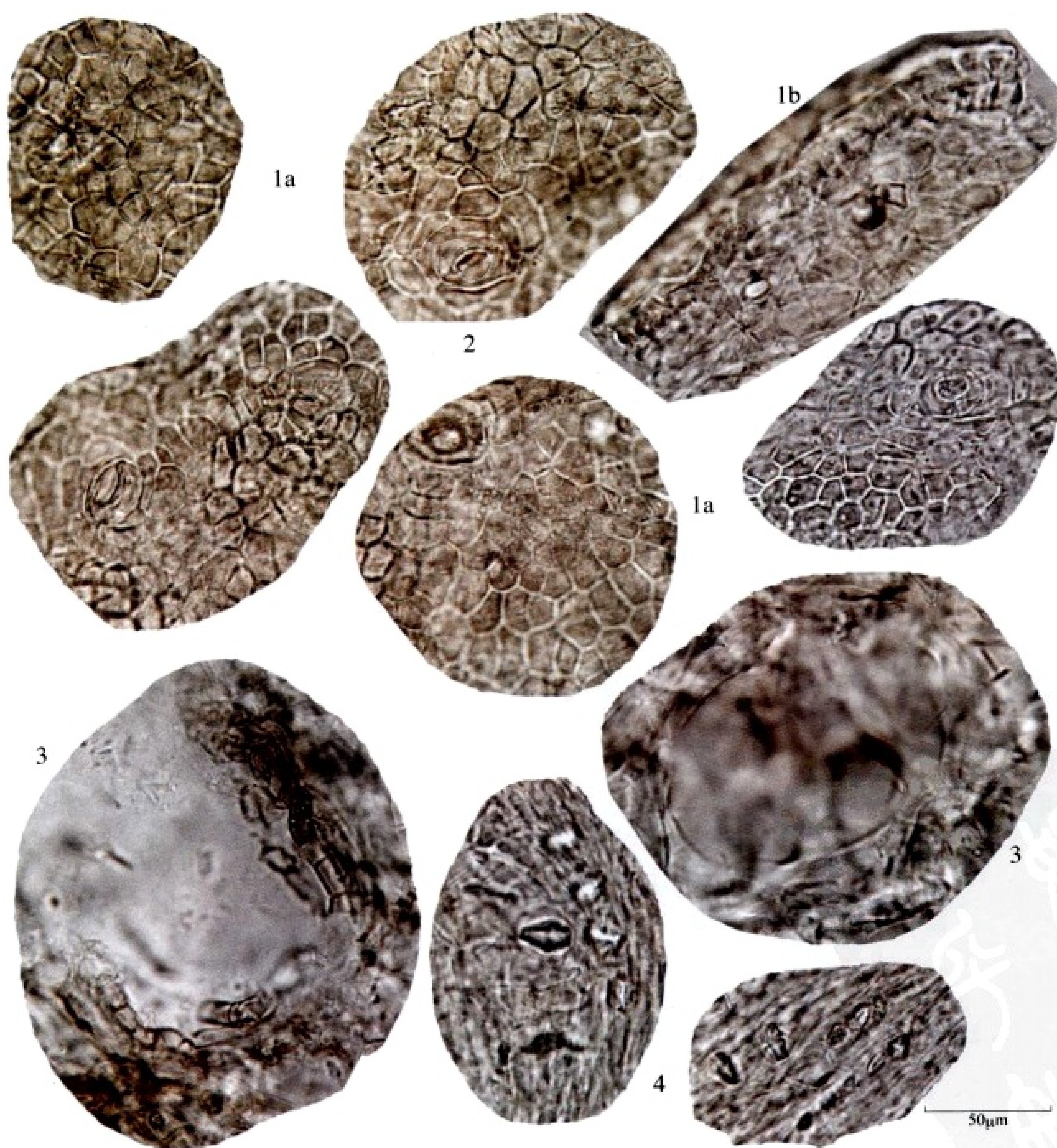


图1　橘红（*Citrus reticulata* 外层果皮）粉末

[Fig1　Powder of outer layer of pericarp from *Citrus reticulata*]

1. 表皮细胞[Epidermal cells（a.表面观Surface view　b.侧面观Lateral view）　2. 气孔（Stomata）

3. 油室碎片（Fragments of oil cavities）　4. 草酸钙方晶（Prisms of calcium oxalate）

橘　核

Juhe

SEMEN CITRI RETICULATAE

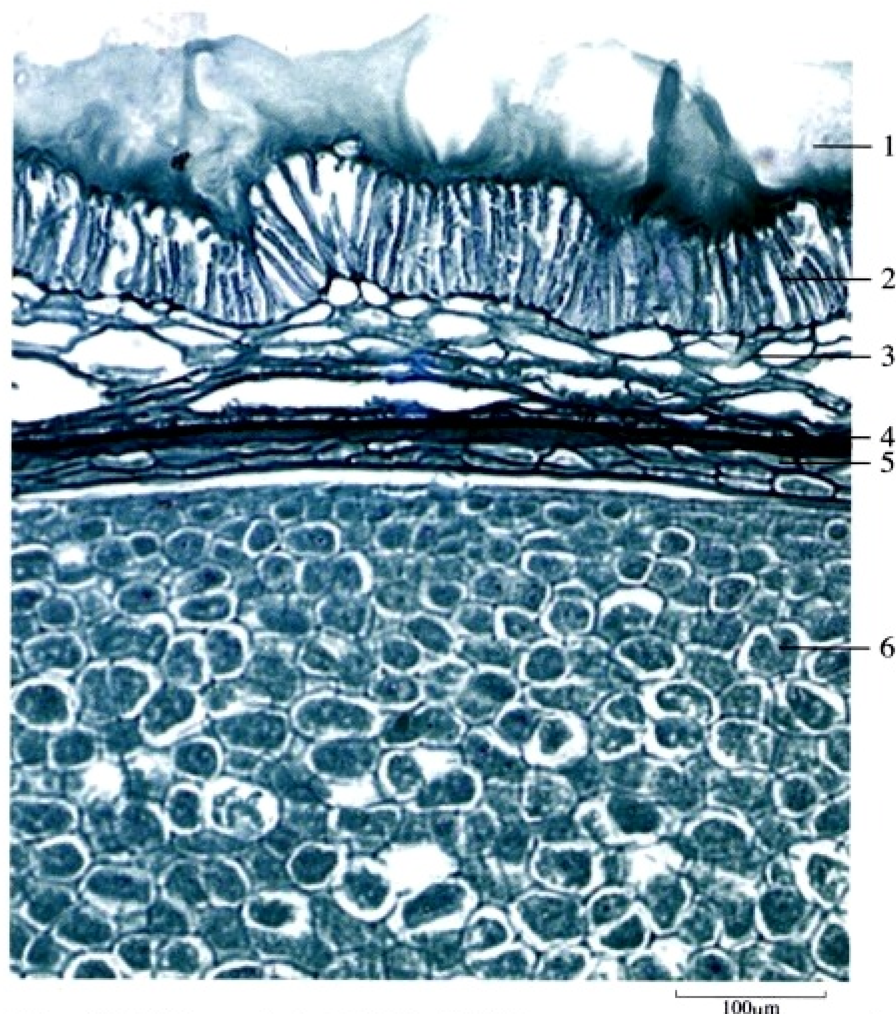


图1　橘核（*Citrus reticulata* 种子）横切面

[Fig1　Transverse section of seed from *Citrus reticulata*]

1. 种皮表皮（Epidermal of testa）　2. 厚壁细胞（Sclerenchymatous cells）　3. 色素层（Pigment layer）　4. 草酸钙方晶（Prisms of calcium oxalate）　5. 胚乳细胞（Endosperm cells）　6. 子叶细胞（Cotyledon cells）

本品为芸香科植物橘*Citrus reticulata* Blanco及其栽培变种的干燥成熟种子。

[显微特征]　本品横切面：种皮表皮细胞为黏液细胞层；其下为1列厚壁细胞，排列成栅状，外壁完整或上端呈尾状突起，壁厚薄不匀，木化，具十字形或斜纹孔；色素层细胞含橙黄色或黄棕色物，并含草酸钙方晶，直径7～16μm。胚乳细胞3～4列，有的壁连珠状增厚，含脂肪油滴。子叶细胞含细小草酸钙簇晶或方晶，并含脂肪油滴及针簇状橙皮苷结晶。（图1、2）

Transverse section: Epidermal cells of testa consisting of mucilage cells, with 1 layer of palisade-arranged sclerenchymatous cells underneath, outer walls even or with a tail-like convex at the upper end, cell walls unevenly and lignified, with cross-shaped or oblique pits in thickness; cells of pigment layer containing orange-yellow or yellowish-brown contents and prisms of calcium oxalate, 7 ~ 16 μm in diameter. Endosperm cells in 3 ~ 4 layers, some with beaded walls, containing oil droplets. Cotyledon cells containing fine clusters or prisms of calcium oxalate, oil droplets and rosette crystals of hesperidin. (Fig 1,2)

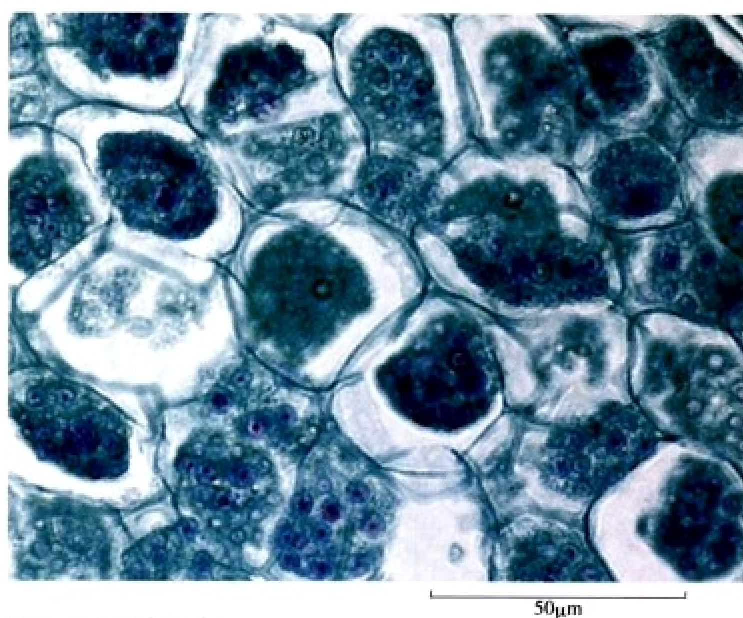


图2　示子叶细胞

[Fig2　Showing cotyledon cells]

藏 菖 蒲

Zangchangpu

RHIZOMA ACORI CALAMI

本品为天南星科植物藏菖蒲 *Acorus calamus* L. 干燥根茎。

[显微特征] 本品横切面：表皮细胞类方形，外壁增厚，棕褐色。皮层宽广，可见通气组织，由薄壁细胞构成，排列成网状，有大型腔隙；散有纤维束及叶迹维管束，叶迹维管束外韧型；内皮层明显。中柱散列多数维管束，周木型及外韧型。薄壁组织中散有棕色油细胞。薄壁细胞含淀粉粒。（图1、2）

Transverse section: Epidermal cells subsquare with thickened outer walls, brown. Cortex broad, aerenchyma visible, loosely net-like arranged, composed of parenchymatous cells and large lacuna; scattered with fibre bundles and collateral leaf-trace bundles, endodermis distinct. Stele scattered with numerous amphivasal or collateral vascular bundles. Parenchyma scattering brown oil cells, and parenchymatous cells containing starch granules. (Fig 1, 2)

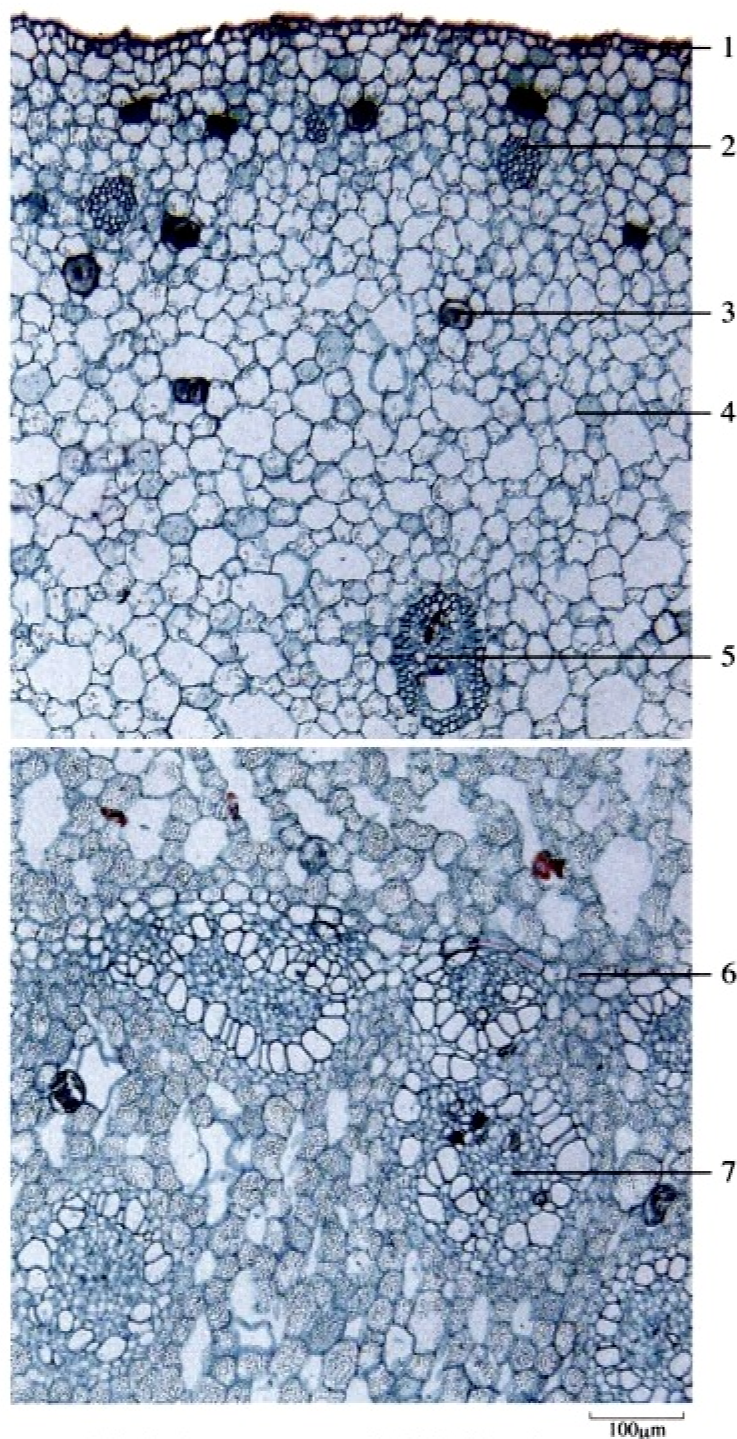


图1 藏菖蒲（*Acorus calamus* 根茎）横切面

[Fig1 Transverse section of rhizome from *Acorus calamus*]

1. 表皮（Epidermis） 2. 纤维束（Fibre bundles） 3. 油细胞（Oil cells） 4. 皮层（Cortex） 5. 叶迹维管束（Leaf-trace vascular bundles） 6. 内皮层（Endodermis） 7. 周木型维管束（Amphivasal vascular bundles）

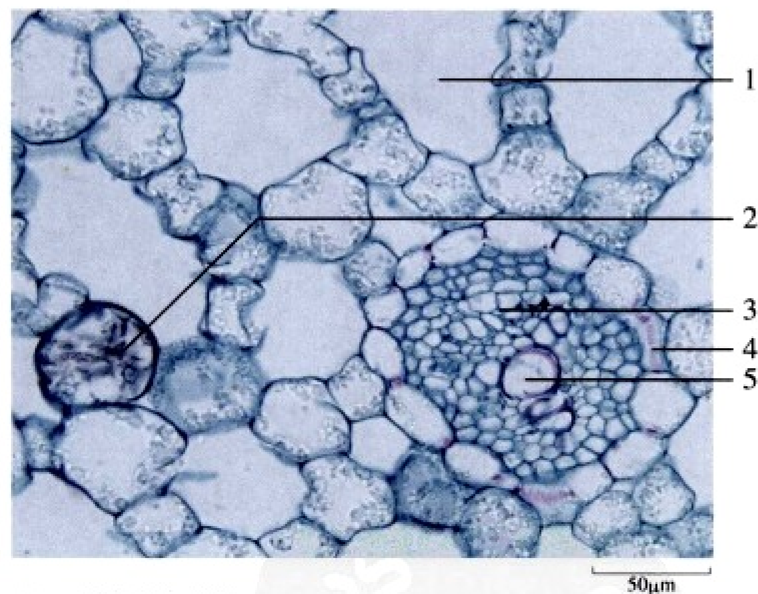


图2 局部组织放大

[Fig2 Partial tissue magnified]

1. 大型细胞间隙（Large intercellular space） 2. 油细胞（Oil cells） 3. 叶迹维管束，示韧皮部筛管群（Leaf-trace vascular bundles, showing phloem sieve tube groups） 4. 内皮层细胞，示凯氏带（Endodermal cells, showing caspariam strip） 5. 木质部导管（Xylem vessels）

檀　　香

Tanxiang

LIGNUM SANTALI ALBI

本品为檀香科植物檀香*Santalum album* L. 树干的心材。

[显微特征]　本品横切面：导管单个散在，偶有2～3个联合。木射线由1～2列径向延长的细胞组成。木薄壁细胞单个散在或数个联结，有的含草酸钙方晶。导管、射线细胞、木薄壁细胞内均可见油滴。（图1）
Transverse section: Vessels scattered singly, 2～3 aggregated occasionally. Xylary rays consisting of 1～2 rows of radially elongated cells. Xylary parenchymatous cells scattered singly or several aggregated, some containing prisms of calcium oxalate. Oil drops visible in vessels, ray cells and xylary parenchymatous cells.（Fig 1）

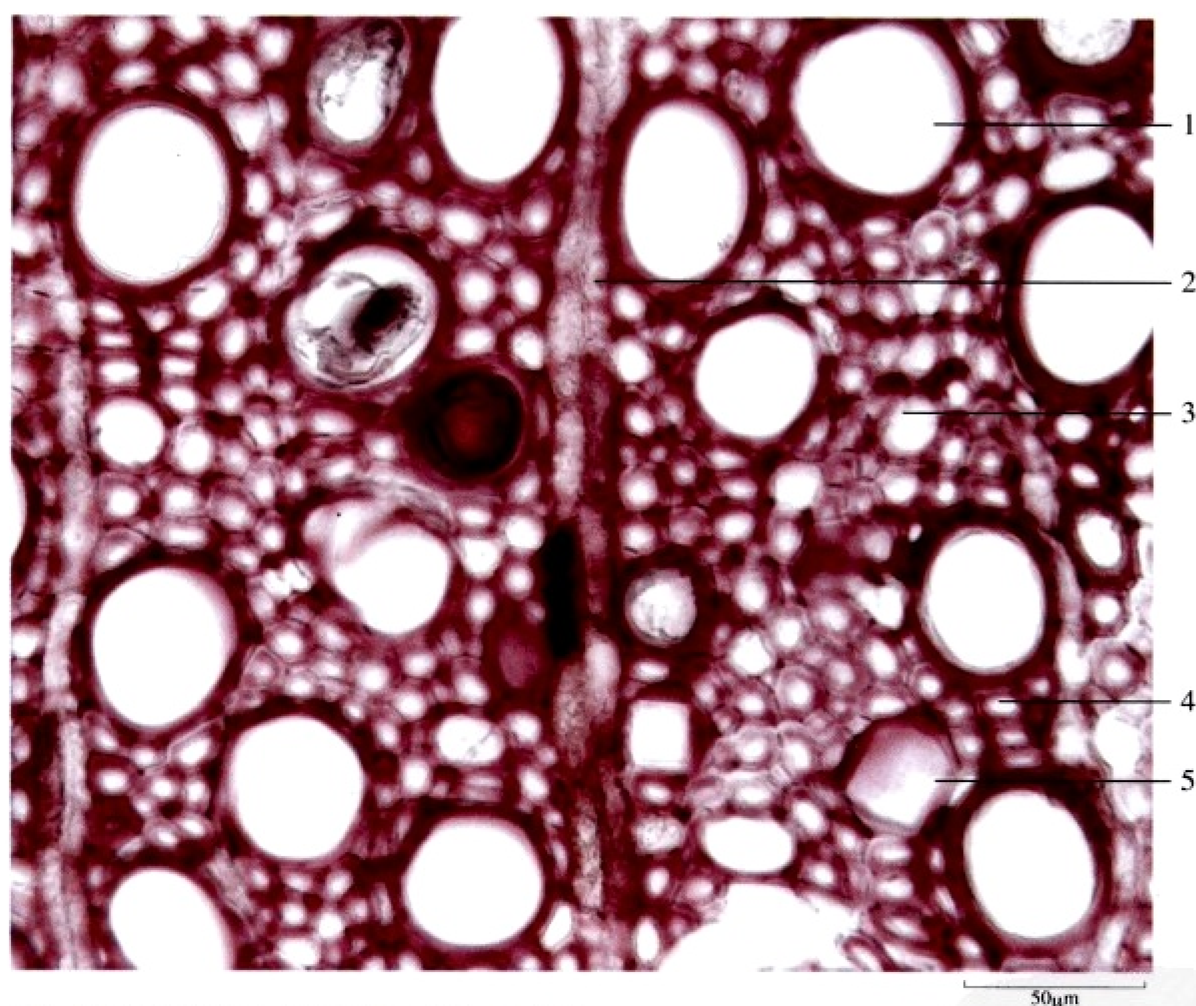


图1　檀香（*Santalum album* 树干心材）横切面
[Fig1　Transverse section of heart wood from *Santalum album*]
1. 导管（Vessels）　2. 木射线（Xylem rays）　3. 木薄壁细胞（Xylary parenchymatous cells）　4. 木纤维（Xylem fibres）　5. 草酸钙方晶（Prisms of calcium oxalate）

覆 盆 子

Fupenzi

FRUCTUS RUBI

本品为蔷薇科植物华东覆盆子*Rubus chingii* Hu 的干燥果实。

[显微特征]　本品粉末：棕黄色。非腺毛单细胞，长60～450μm，直径12～20μm，壁甚厚，木化，大多数具双螺纹，有的体部易脱落，足部残留而埋于表皮层，表面观圆多角形或长圆形，直径至23μm，胞腔分支，似石细胞状。草酸钙簇晶较多见，直径18～50μm。果皮纤维黄色，上下层纵横或斜向交错排列。(图1)

Powder: Brownish-yellow. Non-glandular hairs unicellular, 60～450 μm long, 12～20 μm in diameter, walls strongly thickened, lignified, mostly with double spiral striations, the upper part of some hairs easily fallen off, and the remains embeded in epidermis, rounded-polygonal or oblong in surface view, up to 23 μm in diameter, lumina branched, similar to stone cells in shape. Clusters of calcium oxalate frequently visible, 18～50 μm in diameter. Fibres of pericarp yellow, crisscross or obliquely alternate. (Fig 1)



图1　覆盆子（*Rubus chingii* 果实）粉末

[Fig1　Powder of fruit from *Rubus chingii*]

1. 非腺毛（Non-glandular hairs）　2. 果皮表皮细胞及非腺毛残迹（Pericarp epidermal cells and remaids of non-glandular hairs）　3. 草酸钙簇晶（Clusters of calcium oxalate）　4. 果皮纤维（Fibres of pericarp）

麝　　香

shexiang

MOSCHUS

本品为鹿科动物林麝*Moschus berezovskii* Flerov、马麝*Moschus sifanicus* Przewalski 或原麝*Moschus moschiferus* Linnaeus 成熟雄体香囊中的干燥分泌物。

［显微特征］麝香仁粉末：棕褐色或黄棕色。为无数无定形颗粒状物集成的半透明或透明团块，淡黄色或淡棕色；团块中包埋或散在有方形、柱形、八面体形或不规则形的晶体；并可见圆形油滴，偶见毛及内皮层膜组织。（图1）

Powder of "Shexiangren": Brown or yellowish-brown. In translucent or transparent masses aggregated from numerous amorphus granules, pale yellow or pale brown; with cubic, cylindrical, octahydronal or irregular crystals embedded or scattered in the masses; rounded oil drops visible, hairs and inner membrane tissues occasionally found. (Fig 1)

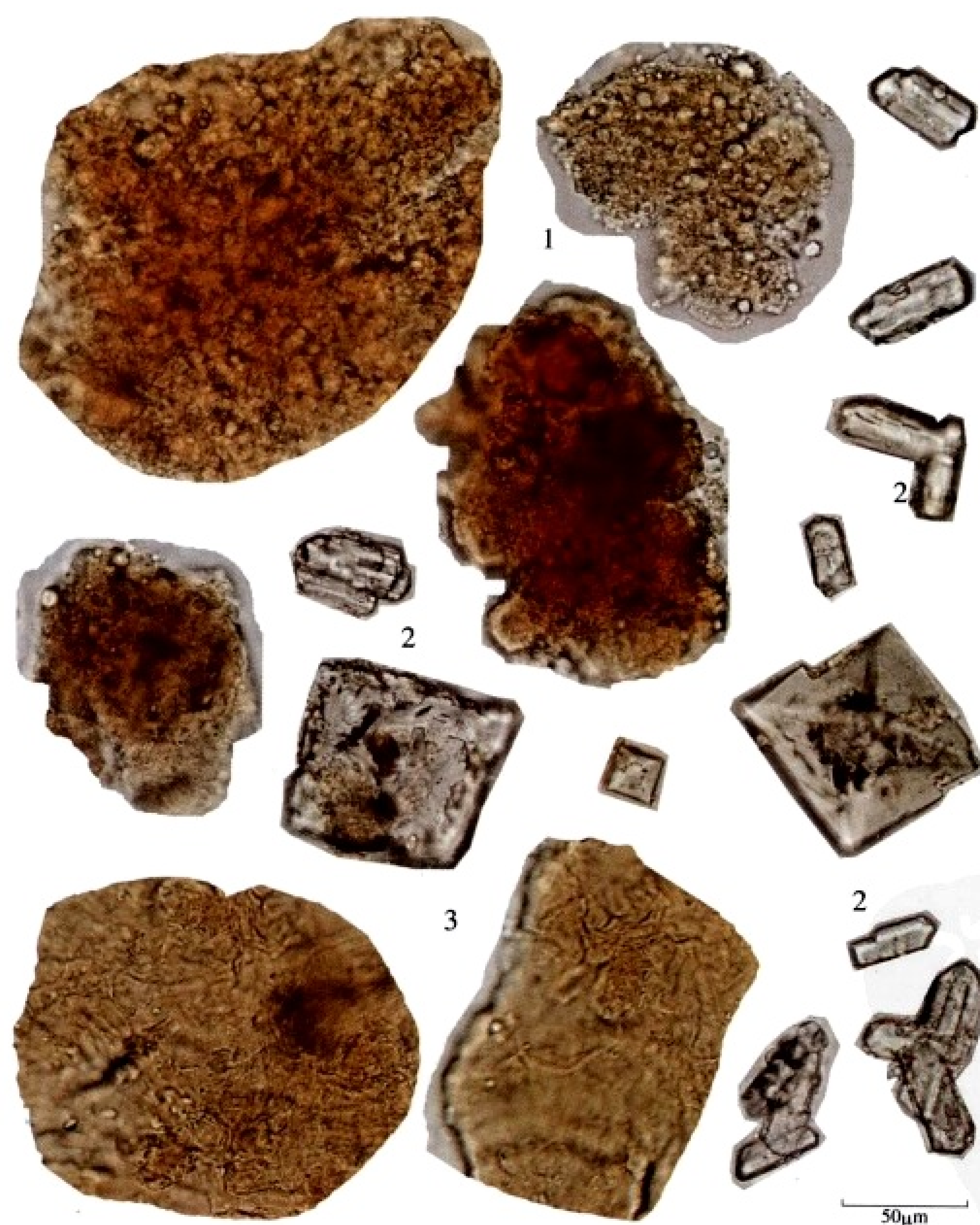


图1　麝香粉末

[Fig1　Powder of secretory substance of *Moschus berezovskii*]

1. 分泌物团块（Secretory masses）　2. 晶体（Crystals）　3. 内皮层膜组织（Inner membrane tissues）

附　录

关于修改品种目录与说明

在本书编著及实验过程中，发现一些药材特征与2005版药典不尽相符，本书略作修正，内容如下：

1. **大青叶**："叶肉组织分化不明显。"改为"叶肉组织分化不明显；叶肉细胞中含蓝色细小颗粒状物，亦含橙皮苷样结晶。"

2. **山麦冬**："根被为1列细胞。"改为"外皮层为1列细胞"。

3. **山慈菇**："其内有2～3列厚壁细胞，浅黄色，"改为"其内有2～3列细胞，壁稍厚，浅黄色，"

4. **广藿香**："壁具刺状突起"改为"壁具疣状突起"；"腺鳞头部单细胞状，顶面观常作窗形或缝状开裂，直径37～70μm；柄单细胞，极短。间隙腺毛存在于栅栏组织或薄壁组织的细胞间隙中，头部单细胞，"改为"腺鳞头部8细胞，直径37～70μm；柄单细胞，极短。间隙腺毛存在于叶肉组织细胞间隙中，头部单细胞"。

5. **木贼**："表皮内为皮层薄壁组织，位于棱脊内方的厚壁组织成楔形伸入皮层薄壁组织中。沟槽内厚壁组织仅1～2层细胞，皮层薄壁细胞为长柱状或类圆形，沟槽下方有一空腔。内皮层有内外两列，外列呈波状环形，内列呈圆环状，均可见明显凯氏点。维管束外韧型，位于两列内皮层之间与纵棱相对，维管束内侧均有一束中腔，内皮层内方为髓薄壁细胞，扁缩，"改为"皮层为薄壁组织，细胞呈长柱状或类圆形，位于棱脊内方的厚壁组织成楔形向内伸入皮层薄壁组织中。沟槽内厚壁组织仅1～2层细胞，沟槽下方有一空腔；内皮层有内外两列，外列呈波状环形，内列呈圆环状，均可见明显凯氏点。维管束外韧型，位于两列内皮层之间与纵棱相对，维管束内侧均有一束内腔。髓薄壁细胞扁缩，中央为髓腔。"

6. **牛蒡子**："内果皮石细胞略扁平，表面观……横长"。改为"内果皮石细胞略扁平，表面观……横长；侧面观类长方形或长条形，侧弯"。

7. **毛诃子**：删去"管状厚壁细胞，壁厚木化。""非腺毛易见，为2～3细胞，内含棕黄色物。草酸钙簇晶众多，直径17～54μm。……外皮细胞具网纹。"改为"非腺毛易见，为2细胞，基部细胞常内含棕黄色物。草酸钙簇晶众多，直径13～65μm。……外果皮表皮细胞具非腺毛脱落的瘢痕。"

8. **北豆根**：粉末"淀粉粒直径约1μm。"改为"淀粉粒单粒直径约3～12μm；复粒2～8分粒。"

9. **百部**：对叶百部"中柱韧皮部束36～40个"，改为"中柱木质部束和韧皮部束各32～40个"。

10. **决明子**："种皮支持细胞……可见两个同心圆圈。"改为"种皮支持细胞……可见两个同心圆圈；侧面观呈哑铃状或葫芦状。"

11. **红景天**："中柱占根茎的大部分，散生维管束；最外侧有外韧型维管束，放射状排列成环；韧皮部狭窄，木质部导管5至数个相聚，稀疏排列；射线2～4列细胞；内侧为周木型维管束，星状排列。髓部宽广，散生维管束。"改为"木栓层为数列细胞，栓内层不明显。皮层窄。中柱维管束为大型的周韧型维管束，放射状环列；维管束中内侧和外侧的维管组织发达呈对列状，中间为薄壁组织，韧皮部

和木质部近等长，被次生射线分隔成细长条形，形成层明显。髓部宽广，由薄壁细胞组成，散生周韧型的髓维管束。”

12. **芫花**：“本品表面观：花粉粒黄色，类球形，直径23～45μm，表面有较明显的网状雕纹。”改为“本品粉末：棕褐色。花粉粒黄色，类球形，直径23～45μm，表面有较明显的网状雕纹，萌发孔多数，散在。”

13. **苍耳子**：“纤维成束或单个散在，细长梭形，纹孔及孔沟明显或不明显。”改为“总苞纤维成束，常呈纵横交叉排列。果皮表皮细胞棕色，类长方形，常与下层纤维相连。果皮纤维成束或单个散在，细长梭形，纹孔及孔沟明显或不明显。种皮细胞淡黄色，外层细胞类多角形，壁稍厚；内层细胞具乳头状突起。”

14. **沙棘**：“果皮表皮细胞多角形，垂周壁稍厚。表皮上鳞毛较多，”改为“果皮表皮细胞表面观多角形，垂周壁稍厚。表皮上盾状毛较多，”

15. **谷精草**：“腺毛头部长椭圆形，1～4细胞，表面有细密网状纹理；柄单细胞。”改为“腺毛头部长椭圆形，1～4细胞，顶端细胞较长，表面有细密网状纹理；柄单细胞。”

16. **玫瑰花**：“腺毛……柄部多列性，”改为“腺毛……柄部多细胞多列性，”

17. **郁金**：黄丝郁金“根被最内层细胞壁增厚。有的木质部导管与纤维连接成环。”改为“根被最内层细胞壁增厚。中柱韧皮部束与木质部束各22～29个，间隔排列；有的木质部导管与纤维连接成环。”桂郁金“根被细胞……层纹明显。导管类圆形，”改为“根被细胞……层纹明显。中柱韧皮部束与木质部束各42～48个，间隔排列；导管类圆形，”绿丝郁金增加“根被细胞壁无增厚。”“韧皮部皱缩，木质部束，64～72个，导管扁平。”改为“韧皮部皱缩，木质部束64～72个，导管扁圆形。”

18. **香薷**　**青香薷**：“上下表皮具非腺毛，多由2个细胞组成，上部细胞多弯曲呈钩状，疣状突起较明显；果皮表皮密布穴窝，穴窝内细胞扁平，排列致密。”改为“上下表皮具非腺毛，多碎断，完整者1～6细胞，上部细胞多弯曲呈钩状，疣状突起较明显。小腺毛少见，头部圆形或长圆形，1～2细胞，柄甚短1～2细胞。”

江香薷　删去“果皮表皮细胞多边形，密布下陷网眼，可见小腺毛，维管束呈网络状分布。”

19. **禹州漏芦**“可见菊糖。”改为“分泌管长条状，直径26～60μm，内含红棕色分泌物”。

20. **栀子**：“内果皮石细胞类长方形……；含晶石细胞……胞腔内常含草酸钙方晶”，改为“内果皮石细胞类长方形、类圆形或类三角形，常上下层交错排列或与纤维连结，直径14～34μm，长约至75μm，壁厚4～13μm；胞腔内常含草酸钙方晶。内果皮纤维细长，梭形，直径约10μm，长约至110μm，常交错、斜向镶嵌状排列。”

21. **珍珠母**：增加：“棱柱形碎块少见，断面观呈棱柱状，断面大多平截，有明显的横向条纹，少数条纹不明显。”

22. **荆芥**：“外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物。内果皮石细胞淡棕色，垂周壁深波状弯曲，密具纹孔。”改为“外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物；断面观细胞类方形或类长方形，胞腔小。内果皮石细胞淡棕色，表面观垂周壁深波状弯曲，密具纹孔。”

23. **荆芥穗**：“外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物。内果皮石细胞淡棕色，垂周壁深波状弯曲，密具纹孔。”改为“外果皮细胞表面观多角形，壁黏液化，胞腔含棕色物；断面观细胞类方形或类长方形，胞腔小。内果皮石细胞淡棕色，表面观垂周壁深波状弯曲，密具纹孔。”

24. **荜茇**：“种皮细胞红棕色，表面观呈长多角形，壁连珠状增厚。”改为“内果皮细胞表面观呈长多角形，垂周壁不规则连珠状增厚，常与棕色种皮细胞连结。种皮细胞红棕色，长多角形。”

25. **桑白皮**：“淀粉粒甚多，类圆形，直径4～16μm。”改为“淀粉粒甚多，单粒类圆形，直径4～16μm；复粒由2～8分粒组成”。

26. **桑枝**：增加“木栓细胞表面观呈多角形，垂周壁平直或弯曲。”

27. 粉葛："淀粉粒甚多，单粒球形、半圆形或多角形，直径3～37μm，脐点点状、裂缝状或星状；复粒由2～10分粒组成。纤维多成束，壁厚，木化，周围细胞大多含草酸钙方晶，形成晶纤维，含晶细胞壁木化增厚。石细胞少见，类圆形或多角形，直径38～70μm。具缘纹孔导管较大，具缘纹孔六角形或椭圆形，排列极为紧密。"改为"淀粉粒甚多，单粒少见，圆球形，直径8～15μm，脐点隐约可见；复粒多，由2～20多分粒组成。纤维多成束，壁厚，木化，周围细胞大多含草酸钙方晶，形成晶纤维，含晶细胞壁木化增厚。石细胞少见，类圆形或多角形，直径25～43μm。具缘纹孔导管较大，具缘纹孔椭圆形，排列极为紧密。"

28. 荷叶："上表皮细胞多角形，外壁乳头状或短绒毛状突起；"改为"上表皮细胞表面观多角形，外壁乳头状或短绒毛状突起，呈双圆圈状；断面观长方形，外壁呈乳头状突起；"

29. 密蒙花："本品花萼及花冠表面观：下表面密被非腺毛，通常为4细胞"改为"本品粉末：棕色。非腺毛通常为4细胞""花粉粒类球形，……，有3个萌发孔。"改为"花粉粒类球形，……，有3个萌发孔。腺毛头部顶面观（1～）2细胞，2细胞者并列呈哑铃形或蝶形；柄极短。"

30. 猫爪草："木质部、韧皮部各2束"。改为"木质部、韧皮部各2～3束"。

31. 菊苣：毛菊苣茎"表皮偶有多细胞腺毛。棱角处皮下为厚角细胞，内层细胞充满黄棕色内含物，内皮层凯氏点较明显，"改为"表皮偶有多细胞腺毛。棱角处皮下为厚角细胞，皮层细胞充满黄棕色内含物；内皮层细胞凯氏点较明显"。

毛菊苣根"韧皮射线单列。"改为"韧皮射线细胞单列或多列；""木射线1～6列"改为"木射线1～6列细胞宽"。

32. 菟丝子："种皮栅状细胞成片，断面观2列，具光辉带；表面观呈多角形，皱缩。"改为"种皮栅状细胞成片，断面观2列，外列细胞较内列细胞短，具光辉带，位于内侧细胞的上部；表面观呈多角形，皱缩。"

33. 蛇床子："油管多破碎，内壁有金黄色分泌物，可见类圆形油滴。表皮细胞类长方形，垂周壁波浪状弯曲或呈串珠状。草酸钙簇晶或类方晶，直径3～6μm。薄壁细胞类圆形，浅黄色或无色，表面具网状纹理。"改为"油管多破碎，内壁有金黄色分泌物，可见类圆形油滴。内果皮镶嵌层细胞浅黄色，表面观长条形，壁呈连珠状增厚。薄壁细胞类方形或类圆形，无色，壁条状或网状增厚。草酸钙簇晶或方晶直径3～6μm。"

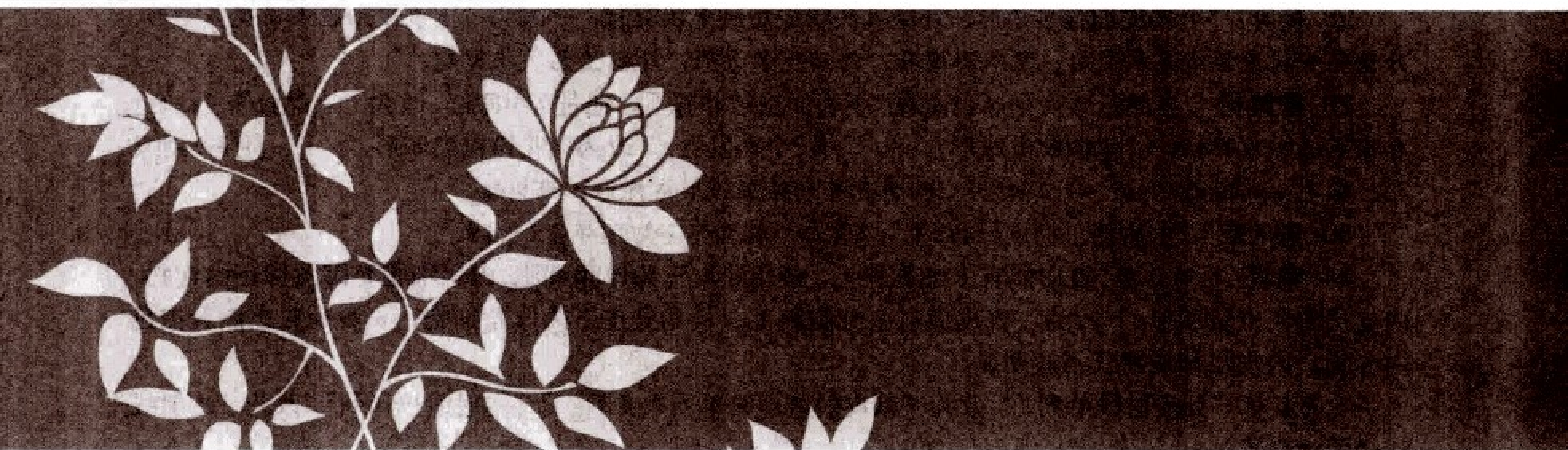
34. 黄藤：原组织横切面特征删去，改为"本品粉末：淡黄色。导管为网纹导管和具缘纹孔导管，多破碎，完整者直径至150μm。木栓细胞黄棕色，表面观类多角形，有的壁木化增厚似石细胞。木纤维单个散在或成束，壁增厚，具缘纹孔稀疏。石细胞单个散在或成群，类方形或多角形，直径40～120μm，壁厚，层纹、孔沟明显，有的胞腔内含棕色物。木射线细胞长方形，纹孔较明显。草酸钙方晶直径20～40μm。淀粉粒多为复粒，由2～5分粒组成。"

35. 槐花："花粉粒类球形或钝三角形，直径14～19μm，具3 个萌发孔。非腺毛1～3细胞，长86～660μm。气孔不定式，副卫细胞4～8个。草酸钙方晶少见。"改为"花粉粒类球形或钝三角形，直径14～19μm，具3 个萌发孔。萼片表皮细胞表面观呈多角形；非腺毛1～3细胞，长86～660μm。气孔不定式，副卫细胞4～8个。草酸钙方晶较多。"

36. 满山红："凹陷处有腺鳞；下表皮细胞近圆形，壁波状，有气孔和腺鳞。……薄壁细胞及海绵细胞含草酸钙簇晶。"改为"凹陷处有盾状毛；下表皮细胞近圆形，壁波状，有气孔和盾状毛。……薄壁细胞含草酸钙簇晶。"

37. 酸枣仁："种皮栅状细胞……胞腔小。内种皮细胞棕黄色，"改为"种皮栅状细胞……胞腔小；侧面观呈长条形，外壁增厚，侧壁上、中部甚厚，下部渐薄；底面观类多角形或圆多角形。种皮内表皮细胞棕黄色，"

38. 檀香：将"木纤维与纤维管胞无明显区别"删除。





Appendix

Contents and explanations about the revised species

During the process of compiling this book, some microscopic features of a few species were found different from those recorded in C. P. 2005 edition. Accordingly, we made some revisions as follows based on our practical research.

1. Folium Isatidis

Original: Mesophyll indistinctly differentiated.

Revised: Mesophyll indistinctly differentiated, mesophyll cells containing numerous blue granules and hesperidin-like crystals.

2. Radix Liriopes

Original: Velamen of 1 layer of cells.

Revised: Exodermis of 1 layer of cells.

3. Pseudobulbus Cremastrae Seu Pleiones

Original: 2 ~ 3 layers of sclerenchymatous cells beneath, yellowish.

Revised: 2 ~ 3 layers of yellowish slightly thickened cells beneath.

4. Herba Pogostemonis

Original: Walls spinulous. Glandular scales with an unicellular head, frequently window-shaped or cleft in surface view, 37 ~ 70μm in diameter, and an unicellular, very short stalk. Intercellular glandular hairs occurring in the intercellular spaces of the palisade or parenchyma, with an unicellular head.

Revised: Walls warty. Glandular scales with an 8 celled head, 37 ~ 70μm in diameter, and a very short unicellular stalk. Intercellular glandular hairs occurring in the intercellular spaces of mesophyll tissue, with an unicellular head.

5. Herba Equiseti Hiemalis

Original: Cortex parenchyma occurring inside epidermis; sclerenchyma occurring inside ridges and inserting into cortex parenchyma in cuneate shape. Sclerenchyma located in grooves, of 1 ~ 2 layers. Cortex parenchymatous cells long cylindrical or subrounded, an empty lumen located in grooves. Endodermis of 2 layers, outer one in sinuous ring, and inner one in rounded ring. Casparian dots distinct and visible in both layers. Vascular bundles collateral, located between two layers of endodermis, and beneath the ridges,



a centre lumen occurring in inner part of each vascular bundle, pith parenchymatous cells located inside endodermis, and flattened and shrunken.

Revised: Cortex parenchymatous cells long cylindrical or subrounded; sclerenchyma occurring inside ridges and inserting into cortex parenchyma in cuneate shape. Sclerenchyma in grooves 1～2 layers, an empty lumen located under the grooves. Endodermis of 2 layers, outer one in sinuous ring, and inner one in rounded ring. Casparian dots distinct in both layers. Vascular bundles collateral, located between two layers of endodermis, and beneath the ridges, a centre lumen occurring in inner part of each vascular bundle, pith parenchymatous cells flattened and shrunken, with pith lumen in centre.

6. Fructus Arctii

Original: Stone cells of endocarp slightly flattened, ··· with transversely elongated pits.

Revised: Stone cells of endocarp slightly flattened, ··· with transversely elongated pits; subrectangular or stripe-shaped in lateral view, relatively curved.

7. Fructus Terminaliae Billericae

Delete: Vasculum-like tracheary element, lignified.

Original: Non-glandular hairs easily visible, 2-3 celled brownish-yellow content containing. Clusters of calcium oxalate abundant, 17～54μm in diameter. ··· lignified, pit-canal well-marked. Exocarp cells with reticulated pits.

Revised: Non-glandular hairs easily visible, 2-celled, the base cells often containing brownish-yellow contents. Clusters of calcium oxalate abundant, 13～65μm in diameter. ··· lignified, pit canal distinct. Epidermal cells of exocarp with numerous scars of fallen non-glandular.

8. Rhizoma Menispermi

Original: Starch granules about 1μm in diameter.

Revised: Simple starch granules 3～12μm in diameter; compound granules of 2～8 components.

9. Radix Stemonae

Root of *Stemona tuberosa:*

Original: In stele phloem bundles 36～40.

Revised: In stele xylem bundles and phloem bundles 32～40 respectively.

10. Semen Cassiae

Original: Supporting cells of testa···two central circles visible.

Revised: Supporting cells of testa···two concentric circles visible, dumbbell shaped or cucurbit shaped in lateral view.

11. Radix et Rhizoma Rhodiolae Crenulatae

Original: Stele very broad, scattering vascular bundles; collateral vascular bundles radially arranged in a ring in the outer side, phloem relatively narrow, xylem vessels 5 to several grouped and sparsely arranged, rays of 2-4 rows of cells; amphivasal vascular bundles inside, stellately arranged. Pith broad, scattered with vascular bundles.

Revised: Cork consisting of several cells, phelloderm indistinct. Cortex narrow. Vascular cylinder consisting of large amphicribral vascular bundles, bundles radially arranged in a ring; outer and inner vascular tissues of each bundle well developed and oppositely arranged, parenchymatous cells in the middle, phloem and xylem nearly equaled in length and being divided into slimmed shape by secondary rays; cambium distinct. Pith broad, consisting of parenchymatous cells, scattering amphicribral vascular bundles.

12. Flos Genkwa

Original : Surface view: Pollen grains yellow, subspherical, 23 ~ 45μm in diameter, exine with distinct reticulate sculptures.
Revised: Powder: dark brown. Pollen grains yellow, subspherical, 23 ~ 45μm in diameter, exine with distinct reticulate sculptures, numerous germinal apertures scattered.

13. Fructus Xanthii

Original: Fibres, bounder singly scattered, acerose and fusiform, pits and pit-canals visible or invisible.
Revised: Fibres of involucrum in bundles, arranged crisscross. Epidermal cells of pericarp brown, subsquare, often linked with fibres; fibres of pericarp gathered in bundles or scattered singly, acerose and fusiform, pits and pit canals visible or invisible. Testa cells pale yellow, cells of outer layer polygonal with slightly thickened walls; cells of inner layer with papillae.

14. Fructus Hippophae

Original: Epidermal cells of pericarp polygonal, anticlinal walls slightly thickened. Peltate hairs numerous on epidermis.
Revised: Epidermal cells of pericarp polygonal in surface view, anticlinal walls slightly thickened. Peltate hairs numerous on epidermis.

15. Flos Eriocauli

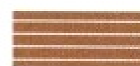
Original: The head of glandular hair long elliptical, 1 ~ 4 celled, surface bearing densely fine reticulate striation, stalk unicellular.
Revised: The head of glandular hair long elliptical, 1 ~ 4 celled, apical cells relatively long, surface bearing densely fine reticulate striation, stalk unicellular.

16. Flos Rosae Rugosae

Original: Glandular hairs, with a multicellular head, oblate, 64 ~ 180μm in diameter, and a multiseriated stalk, 50 ~ 340μm long, sometimes showing unicellular branches at the base.
Revised: Glandular hairs, with multicellular heads and multicellular multiseriated stalks, heads oblate, 64 ~ 180μm in diameter, stalks 50 ~ 340μm long, sometimes showing unicellular branches at the base.

17. Radix Curcumae

Huangsiyujin
Original: The walls of the innermost layer of velamen cells thickened. Sometimes xylem vessels and fibres arranged in a continuous ring.
Revised: Walls of the innermost layer of velamen cells thickened. Phloem bundles and xylem bundles 22 ~ 29,



respectively, arranged alternatively; some xylem vessels and fibres arranged in a continuous ring.

Guiyujin

Original: Walls of velamen cells, with distinct striations. Vessels subrounded.

Revised: Walls of velamen cells, with distinct striations. Phloem bundles and xylem bundles 42 ~ 48, respectively, arranged alternatively; vessels subrounded.

Lüsiyujin

Add: Velamen cells thin walled.

Original: Phloem bundles shrivelled, xylem bundles 64 ~ 72, vessels flattened.

Revised: Phloem bundles shrivelled, xylem bundles 64 ~ 72, vessels flat rounded.

18. Herba Moslae

Qingxiangru:

Original: Non-glandular hairs on the upper and lower epidermis mostly 2-celled, the upper cells frequently hook-like, warty protrudings distinct. Pericarpial epidermis with sockets densely, cells in the sockets flat and densely arranged.

Revised: Non-glandular hairs on the upper and lower epidermis mostly broken, 1 ~ 6 celled when whole, the upper cells frequently hook-like, warty protrudings distinct. Small glandular hairs occasionally visible, heads rounded or long rounded, with 1 ~ 2 cells, stalk short, with 1 ~ 2 cells.

Jiangxiangru :

Delete: Pericarpial epidermal cells polygonal, densely with hollowed reticulations. Small glandular hairs visible. Fibre bundles reticulately arranged.

19. Radix Echinopsis

Original: Inulin visible.

Revised: Secretory tubes sliver-shaped, 26 ~ 60μm in diameter, containing reddish-brown secretions.

20. Fructus Gardeniae

Original: Stone cells of pericarp subrectangular, … crystal stone cells subrounded or polygonal, …lumina containing prisms of calcium oxalate, about 8μm in diameter.

Revised: Stone cells of endocarp subrectangular, subrounded or subtriangular, often interlaced with conjoint layers or linked with fibres, 14 ~ 34μm in diameter, about 75μm long, 4 ~ 13μm in wall thickness, lumina mostly containing prisms of calcium oxalate. Fibres of endocarp long and thin, fusiform, about 10μm in diameter, up to 110μm long, aften interlaced or side long inlaid in arrangement.

21. Concha Margaritifera

Add: Prism-shaped pieces occasionally found, truncate in sectional view, mostly bearing distinct cross stripes or a few indistinct.

22. Herba Schizonepetae

Original: Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown contents. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls, and densely pitted.

Revised: Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown

contents; cells subsquare or rectangular in sectional view and with a small lumen. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls in surface view and densely pitted.

23. Spica Schizonepetae

Original: Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown contents. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls, and densely pitted.
Revised: Cells of exocarp polygonal in surface view, with mucilaginous walls, and containing brown contents; cells subsquare or rectangular in sectional view and with a small lumen. Stone cells of endocarp pale brown, with deeply sinuous anticlinal walls in surface view and densely pitted.

24. Fructus Piperis Longi

Original: Cells of testa reddish-brown, long-polygonal in surface view, wall beaded.
Revised: Endocarp cells long-polygonal in surface view, anticlinal walls irregularly beaded thickened, often linked to brown cells of testa. Cells of testa reddish-brown, long-polygonal.

25. Cortex Mori

Original: Starch granules numerous, subrounded, 4～16μm in diameter.
Revised: Starch granules numerous, simple granules subrounded, 4～16μm in diameter; compound granules of 2～8 components.

26. Ramulus Mori

Add: Cork cells polygonal in surface view, anticlinal walls straight or curved.

27. Radix Puerariae Thomsonii

Original: Starch granules abundant, simple granules spheroidal, semi-rounded or polygonal, 3-37μm in diameter, hilum pointed, cleft or stellate; compound granules of 2-10 components. Fibres mostly in bundles, walls thickened and lignified, surrounded by cells mostly containing prisms of calcium oxalate, forming crystal fibres; crystal cells with lignified and thickened walls. Stone cells infrequently visible, subrounded or polygonal, 38-70μm in diameter. Bordered pitted vessels relatively large, pits hexagonal or elliptical, arranged very densely.
Revised: Starch granules numerous, simple granules infrequent, spheroidal, 8～15μm in diameter, hilum indistinctly visible; compound granules numerous, of 2～20 or more components. Fibres mostly in bundles, walls thickened and lignified, surrounded by cells mostly containing prisms of calcium oxalate, forming crystal fibres; crystal cells with lignified and thickened walls. Stone cells infrequently visible, subrounded or polygonal, 25～43μm in diameter. Bordered pitted vessels relatively large, bordered pits elliptical, very densely arranged; reticulated vessels relatively small.

28. Folium Nelumbinis

Original: Upper epidermal cells polygonal, with papillary or short tomentose protuberances;
Revised: Upper epidermal cells polygonal in surface view, with papillary or short tomentose protuberances, two ring-shaped; rectangular in sectional view, with papillary protuberances;



29. Flos Buddlejae

Original: Calyx and corolla in surface view: The lower epidermis densely covered with non-glandular hairs, usually 4-celled, ··· Pollen grains globose, 13~20μm in diameter, exine smooth. with 3 germinal pores.
Revised: Powder: Brown. Non-glandular hairs usually 4-celled, ···Pollen grains globose, 13-20μm in diameter, exine smooth, with 3 germinal pores. Glandular hari heads (1-)2 celled in top surface view, 2 cells biseriated, dumbbell or butterfly shaped; stalk extremely short.

30. Radix Ranunculi Ternati

Original: xylem and phloem 2 strands each.
Revised: xylem and phloem 2~3 strands each.

31. Herba Cichorii Radix Cichorii

Transverse section of stem of *Cichorium glandulosum:*
Original: Epidermis sometimes with polycellular glandular hairs. Collenchmatous cells occurring under epidermis at the ridges, with yellowish-brown contents; casparian dots on endodermis distinct.
Revised: Epidermis sometimes with polycellular glandular hairs. Collenchmatous cells occurring under epidermis at the ridges, cortex cells containing yellowish-brown contents; casparian dots on endodermal cells distinct.
Transverse section of root of *Cichorium glandulosum:*
Original: Phloem ray in single row.
Revised: Phloem one to several cells wide.
Original: Xylem ray 1~6 rows.
Revised: Xylem 1~6 cells wide.

32. Semen Cuscutae

Original: Palisade cells of testa arranged in pieces, two rows of cells visible in section, with lustrous strip; polygonal shrunken in the surface view.
Revised: Palisade cells of testa arranged in pieces, two rows of cells visible in section view, cells of outer row shorter than those of inner row, with light line located in upper part of the inner row of cells; polygonal in surface view, shrunken.

33. Fructus Cnidii

Original : Vittae frequently broken, inner walls containing golden yellow secretions, subrounded oil droplets visible. Epidermal cells subrectangular, anticlinal walls sinuous or beaded. Calcium oxalate clusters or subprisms, 3~6μm in diameter. Parenchymatous cell subrounded, pale yellow or colourless, teticulated striations visible on surface.
Revised: Vittae frequently broken, subrounded oil droplets visible. Parquet cells of endocarp pale yellow, long slat-shaped in surface view, walls beaded thickened. Parenchymatous cells subsquared or subrounded, colourless, slat-shaped or reticulated thickened on walls. Clusters or prisms of calcium oxalate 3~6μm in diameter.

34. Caulis Fibraureae

Delete: descriptions in "Transverse Section" .

Revised: Powder: Pale yellow. Vessels reticulate or bordered pitted thickened, mostly broken, up to 150μm in diameter when whole. Cork cells yellowish-brown, subpolygonal in surface view, some with lignin-thickened walls like stone cells. Xylem fibres singly scattered or in bundles, with thickened walls and sparse bordered pits. Stone cells single or in groups, subsquare or polygonal, 40 ~ 120μm in diameter, thickened walls with distinct striations and pit canals, some with brown contents in lumina. Cells of xylem rays oblong, pits obvious. Prisms of calcium oxalate 20 ~ 40μm in diameter. Starch granules mostly compound, composed of 2 ~ 5 components.

35. Flos Sophorae

Original: Pollen grains subspherical or obtusely triangular, 14 ~ 19μm in diameter, with 3 pores. Non-glandular hairs consisting of 1 ~ 3 cells, 86 ~ 660μm long. Stomata, anomocytic, with 4 ~ 8 subsidiary cells. Prisms of calcium oxalate infrequently visible.

Revised: Pollen grains subspherical or obtusely triangular, 14 ~ 19μm in diameter, with 3 germinating pores. Epidermal cells of sepals polygonal in surface view; non-glandular hairs consisting of 1 ~ 3 cells, 86 ~ 660μm long. Stomata anomocytic, with 4 ~ 8 subsidiary cells. Prisms of calcium oxalate frequently visible.

36. Folium Rhododendri Daurici

Original: Bearing glandular scales at the sunken places; lower epidermal cells subrounded, with sinuous walls, stomata and glandular scales present. ···Parenchy matous cells and spongy cell containing clusters of calcium oxalate.

Revised: Bearing peltate hairs at the sunken places; lower epidermal cells subrounded, with sinuous walls, stomata and peltate hair present. ···Parenchymatous cells containing clusters of calcium oxalate.

37. Semen Ziziphi Spinosae

Original: Palisade cells of testa small lumen. Cells of tegmen brownish-yellow.

Revised: Palisade cells of testa lumina small; long slat-shaped in lateral view, with thickened outer wall and the walls much thickened in upper and middle parts and gradually thinned towards lower parts; subpolygonal or rounded polygonal in bottom surface view. Cells of endopleura brownish-yellow.

38. Lignum Santali Albi

Delete: The differences between woody fibre and fibre tracheid indistinct.

汉语拼音索引

T

W

X

Y

Z

药材拉丁名索引

G

H

S

拉丁学名索引

D

E

M

N

O

P